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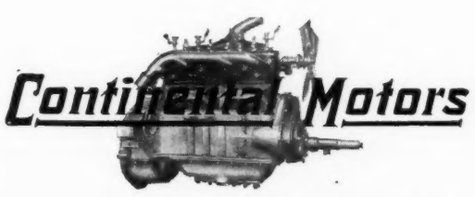

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A DRIDEK Leather Top Will Not Scratch or Chafe
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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XXXVIII NEW YORK—THURSDAY, JANUARY 10, 1918—CHICAGO No. 2

First War Show Justified by Success

High Character of Attendance and Growing Business Gratify Manufacturers—Dealers Studying Conditions—Southeast Strongly Represented

GRAND CENTRAL PALACE, New York, Jan. 8—The first war show of the automobile industry, now three days old and with four days more to run, has already demonstrated that in spite of the war the public is still deeply interested in automobiles and the show gives promise of demonstrating that war shows should be continued. The attendance has not been up to that of former years, but the weather previous to the opening was the coldest in 60 years, which, coupled with the shortage of coal, froze up New Yorkers as they have not been frozen up before in the present generation; and it is only to-day that the crowds that have filled the aisles and exhibit spaces have been on hand as in former years, though not in such great numbers.

What the attendance to-day has lacked in numbers has been made up in character, and the catalog collector and the usual paper following are not present and are not missed, because the dealers have enjoyed a better opportunity of looking over the cars and chassis to-day than they have for several years past. The aisles are not crowded in the forenoons; they are snugly filled in the afternoons and in the evenings. The jam is not like in years past, but the space is comfortably filled. No figures have been given out on attendance, but it is expected that with a continuance of good weather the crowds will not fall far behind those of former years.

The wartime crowds, if the attendance to-day may be so designated, are a little different from those of last year. There are fewer of the young men between 20 and 30 years of age that have been seen at these shows for years, and as the young men are not present there is a proportionate absence in the attendance of young women falling within the same age limits. To-day the persons visiting the show are older—more of those that carry their overcoats slung over their arm instead of checking them downstairs. There is not so much dress as a year ago. The crowd does not resemble a New York crowd in the sense of last year or previous years. It looks more like an out-of-town crowd, and it is. The crowd has a big percentage of dealers from the Southeast, the cotton states which are booming with cotton selling at 30 cents, the highest price since the Civil War. In the Southeast every farmer is in the market for a car, and the de-

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mand for automobiles listing under $1,500 is greater in this section than ever before. The dealers from the Southeast are here in force. Many of them are placing more orders than they can possibly have filled for months.

The dealers, although a little later in arriving than in former years, are coming in in good numbers from other sections, such as New England and even the Middle West. New York State has large numbers, so has New Jersey, Connecticut and other states in the proximity of New York. Chicago has not so large a representation as in former years, but the most substantial ones are here and are going to remain all week.

Show the Opening Wedge of Year

The New York show is looked upon by most of the makers present as a kind of ice-breaking proposition, and as the opening wedge of the 1918 show circuit it is not seriously considered as a dealer show and is not ranked high as a retail show to the 10 per cent of the nation's population that might be said to reside in Greater New York and its environs. New York has been a strong retail show, and it will not do to become pessimistic if it is not this year. Locally New York is frost-tied worse this year than in any other year since the automobile inception in 1895. November and December are generally slow months in New York, and if they are as slow this year as last the trouble cannot be laid to the war, but to weather and general conditions. This year weather conditions have been unduly severe.

As a dealer show New York never has compared with Chicago, and the exhibitors are not expecting to get very close to the dealers, as they never come here in the numbers they come to Chicago, or perhaps Minneapolis or Kansas City or Boston.

The atmosphere within Grand Central Palace is not a subdued war atmosphere; more color meets the eye than at any previous show. This color is not splashed on a few intensified color studies of special show cars trimmed with white bridal ribbons and "keep off" signs, but is sprinkled through every exhibit, as substantial colors, such as grays, greens, blues, browns, carmines, buffs, yellows and reds. They are colors you can use on the street or road without being ashamed of them. They are inspirational colors, and it is indeed fortunate that sombre black has not been too liberally patronized. There are several exhibits of four or five cars in which there is not a single black model. In this list might be mentioned Franklin, Pierce, Velie and several others where only one or two cars are displayed.

Dominant Note of Newness

Besides a healthy variety of color, which is good merchandising in war times, and which is much more stimulating than black even if the colors are not perhaps so serviceable, there is a dominant note of newness in the show. It is not a "tale-that-is-told" type of show, but a show of new designs, some new cars and a few new names. The very general development of the straight-line, beveled-edge body has lent an atmosphere that is magnetic in that the new styles engender an interest that might be lacking if the body lines too closely resembled those of a year ago. Even if the chassis is that of last year, the body is like your new Easter hat. Its sharp corners catch the eye of the visitor who stops and is given an explanation by the salesman, thereby affording the desired audience which may eventually lead to a contract or a sale. It is good merchandising and the show would have needlessly suffered if this atmosphere of newness were missing.

Another aspect of newness is the sport four-passenger model. It is taking well in that it is attractive to the eye, looks considerably lighter than the five-passenger or seven-passenger touring model, and may be described as a war model. There are magnetics in just enough carrying capacity, in reduced weight, and in greater mileage per gallon of fuel this year.

A few makers have added a further touch by the disc wheel, which is with us for the first time. It carries very much of a war visage with its resemblance to the trusty warrior shield of the fifteenth century. There are enough new models such as the small Willys four, the new Studebakers, the Olympian, the Moore, and other changed models to keep up the interest and carry conviction to the visitor that the story of automobile development has not yet all been told and that many succeeding years will be needed before the final chapters of change will be written.

Smaller Advertising Campaign

The advertising campaign through the New York dailies has so far fallen 50 per cent behind that of a year ago. The amount of space is smaller. There are few full-page ads, very few half pages and none of the double pages of past seasons. A more careful expenditure of advertising appropriations is very conspicuous. A commendable feature in some of the advertisements is that they are more of a national nature, intended to carry conviction as to the essential aspect of the industry. John Willys has been a leader in this national sentiment. One advertisement reads: "What railroads are to the nation motor cars are to the individual." Another refers to the automobile as being the shortest distance between two points in the transportation field. These and similar brief messages should have a desirable influence at this time. In general the advertising copy carries quite a different message from that of a year ago.

As an accessory show the present exhibit is the biggest ever, if the expression may be justified. There are more exhibitors, but of a slightly different character. Each sees changes. The representation of pneumatic tire makers is very small. The gasoline storage tank maker that used to have space is not present this year at all. There is a dropping off of makers of parts such as ignition specialties, engines, axles, bearings, etc. There are a great many accessory concerns with small wares.

Unfortunately too few of these accessory makers take the arranging of their spaces as seriously as they should, and as a result the stands are not good places to do business. One maker has arranged his exhibit space into a sample room to display his com-

plete line for jobbers attending the show. Instead of all being piled on a counter along the front of the booth, there are inside aisles on either side of which are sloping tables well stocked with samples of the entire line. This allows the jobber to move into the exhibit, entirely out of the aisle and look over the line and talk prices with that necessary seclusion. More accessory men should follow this example and thus make the show more of a real business center, because each successive year finds the potency of the show more centered in its business value than in its value as a place to satisfy the curiosity of a catalog collecting attendance.

Dealer Wields Big Influence

The dealers are analyzing in a much broader way. They carefully scan the product itself and before going into the matter of taking up representation they are acquainting themselves with the factory resources of men, money and materials. In other words, the strong dealer has become a power and is one of the dominating influences in the business to-day. This is so true that it is often found that it is the big distributor that is shaping the policy of the concern which he represents.

Big distributors seeking to change their lines are in a stronger position this year than ever. They are using, for this very reason, the greatest of care in making connections and it is also because of this that the greatest care is being taken with business transactions at the show.

The lack of a great variety in the real low-price class is commented upon quite commonly by distributors. Cars in the $750 class which would be particularly adaptable to the Southern trade are not to be found on every hand as they were 2 years or even a year ago. These cars have not graduated to the $1,000 class, and consequently the amount of money that the dealer has to put up to secure what is now considered a low-priced line has considerably increased.

Visitors Interested in Motor Development

People who attended the show were experts in motor car development, generally speaking. The exhibitors who employed trained talkers at their booths did not fail to draw an exceptionally large crowd. These people asked a great many questions and these tended to show that development has been followed by the public with marked closeness.

Following a growing tendency of the New York Show, the bigger factory executives were not on the floor. They could be found at the Biltmore, Astor, Belmont, Woodstock, or any of the other large hotels surrounding the Palace. Here suites are retained and used as consultation rooms away from the confusion attendant upon the show itself. The Palace is the showroom and the hotels are the business offices.

Practically all the manufacturers represented at the show are keeping demonstrating cars outside. The new dealer who is looking into a product is demanding a demonstration as well as the retail prospect. In the past years some of the manufacturers have not kept the demonstrator car in mind as well as they should and it has resulted in the loss of interest on many occasions. At the present show the space outside the building of the Palace is quite well filled with the demonstrators of the exhibitors.

There are several South American dealers present and others are expected to be at the show during the week. Reports of the closing of agencies in Brazil have been made by one of the concerns and this same organization has been approached with reference to Japan. One of the factors which has affected this phase of the situation is the scarcity of bottoms, and foreign business is of course subject to the shipping consideration to such an extent that it is not receiving the prominence as regards certain countries that it would normally.

Realizing the demands of the public for cars which have economy as one of the strongest features, dealers themselves are subjecting the chassis exhibited to scrutiny along the same lines. The developments of the year along this line have been largely due to the requests of dealers for the best possible showing on any economy basis and this is being followed up directly by inquiries at the exhibition. As pointed out on other pages of this issue, in the new cars the overhead valve engine predominates to a marked extent and the reason for this given by the manufacturers who have brought out these cars is that with them it is possible to secure the greatest possible returns from a minimum size engine.

A Feeling of Earnestness

The playtime attendant of the show is missing. There are fewer banquets of a formal nature. The N. A. C. C. banquet is only one of a great number of the show-time functions that have been abandoned this year. There is a feeling of earnestness in the air. The new manufacturers are depending on the business done by them through the show circuit to put their propositions on the map. In fact, with some of the newest of the concerns it is a matter of securing dealers on the show circuit or stop their enterprise. The drop in sales in specific territories must be made up by a wider distribution of the product and there is a tendency of expansion among concerns formerly satisfied with a local trade.

Stimulation of sales by offering the buying public something new is always a part of show business and the show of 1918 is no different in this respect. On this occasion we find that the straight-line and the beveled-edge body are offered as a stamp upon the product that it is of 1918 vintage and different from what could be bought a year ago. The four-passenger car of what is known as the sporting type, the addition to the number of stock colors, the addition of improved types of convertible and closed bodies are all parts of the new features of the show. There is a marked appreciation for all of these features in the crowd which has attended during the earlier days of the exhibition.

The New Yorker is always looking for something which is different. Extraordinary features are what hold his interest; however, the car with the magnetic clutch or gearshift, the two steam cars, a front-driven vehicle, will always be surrounded by the crowd who come out of curiosity or to satisfy a craving for the mechanical.

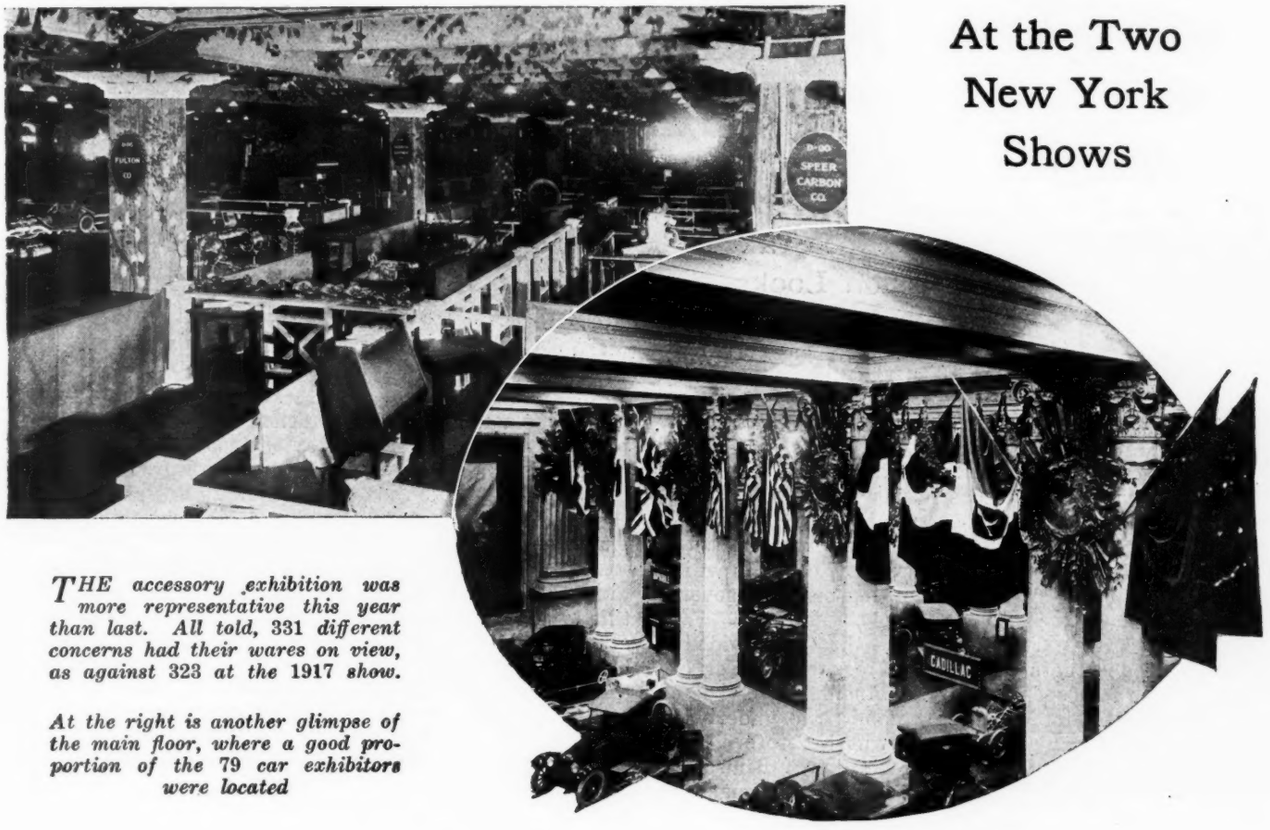
New York's Eighteenth Annual Automobile Show

How the Show Compares With Last Year's Exhibition

	1917	1918
Total Number of Exhibitors	323	331
Number of Car Exhibitors	95	79
Number of Accessory Exhibitors	227	252
Cars and Chassis Exhibited	340	297
Number of Chassis Exhibited	54	34

No show has been more representative of the solidity of the industry

At the Two New York Shows



THE accessory exhibition was more representative this year than last. All told, 331 different concerns had their wares on view, as against 323 at the 1917 show.

At the right is another glimpse of the main floor, where a good proportion of the 79 car exhibitors were located

The Astor Salon has always been an exposition of the last word in high-class, custom-built coach work. This year the exhibition was no exception to the rule

Mechanical Tendencies Revealed By the Show

Interesting Developments in Piston Design—Combined Accessories Drives—Front Exhaust Pipe Take-Downs—Neater Wiring Schemes—Transmission Locks—Overland Small Car Features

By P. M. Heldt

IT is not a difficult matter in going through the show at Grand Central Palace to get up a long list of mechanical changes made in individual cars, but there are few new tendencies in mechanical design discernible. The changes made from last year's models depend in a large number of instances upon individualities in design, and there are not many cases in which the same or similar changes have been made by several firms.

If there is any particular motive that has guided a majority of designers it is that of economy. For example, in the inclosed-car class the inside-drive type of body has greatly increased in number, the underlying idea being that many car owners who heretofore have employed chauffeurs will henceforth drive themselves, and the inclosed-drive type of body naturally makes a special appeal.

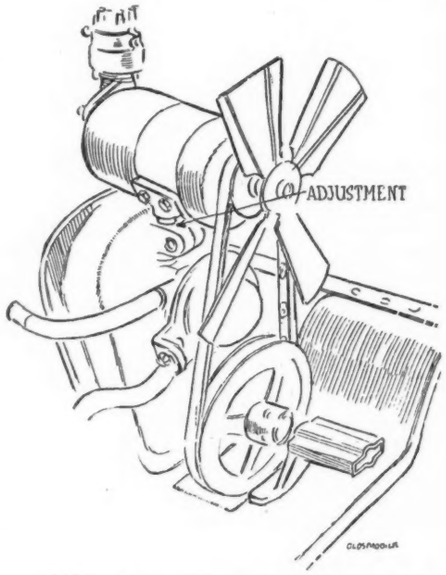
Economy the Keynote

The same object may be discerned in the substitution of oil cups for grease cups on spring shackles and other parts. Filling grease cups is a messy, tedious job, and if the owner has to attend to lubrication himself it is apt to be neglected. With oil cups in these places, of such design that they can be readily opened and closed, much of the drudgery of lubrication is eliminated.

In this connection it is not only the owner caring for his car in his own garage who has to be considered. Owing to the fact that an enormous number of young men have been withdrawn from the industries most garages in the future will have to get along with a reduced force, and the cars stored will only receive such attention as this reduced, and in most cases less experienced, force can give them.

In engine design there is a continued tendency toward separate cylinder heads, one of the latest converts being Cadillac. With such heads the decarbonization of the engine by scraping, which most garage men seem to consider the best all-around method, is greatly facilitated. Probably another factor that favors this construction is that it does away with valve plugs and the placing of spark plugs in them, which is a frequent cause of preignition. With the increasing engine speed and the decreasing cylinder sizes, there is a tendency to use as high compression as possible. The heavier fuels which must now be used having a somewhat lower temperature of ignition, every effort must be made to eliminate hot spots in the combustion chamber wall, and the elimination of valve plugs tends in this direction.

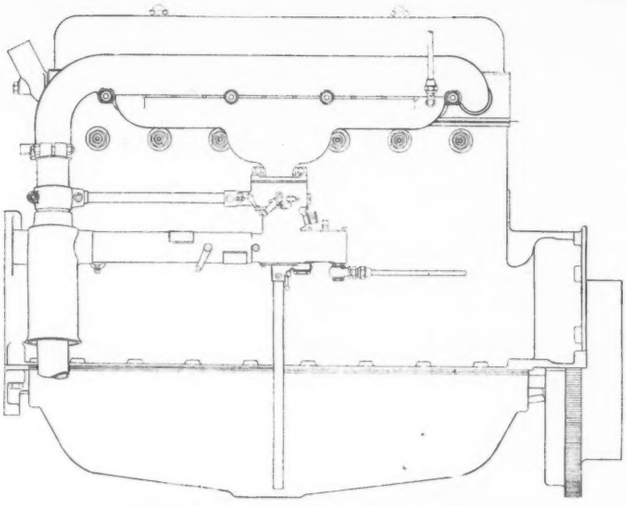
Those firms which have been building aluminum engines during the past year are continuing them, and this type of engine will probably see quite a boom when aluminum prices drop to normal again. The Premier has made an important change in its design, whereby the cast-iron cylinder liner is no longer surrounded by an aluminum shell, but is fitted to the aluminum casting with packings at top and bottom. This results in the cast-iron liner—which is machined all over and therefore of absolutely uniform thickness—being in direct contact with the cooling water on its outside. While with the old style of construction a clearance of 0.009 in. was necessary on the piston skirt, it has now been found possible to reduce this to 0.004 in. The advantage of this is twofold. In the first place it is well known that with aluminum pistons there is a tendency to piston slap when the engine is cold, this being due to the very considerable clearance which must ordinarily be allowed with these pistons. If the clearance can be cut down by more than one half, the cause of piston slap is largely, if not wholly, eliminated.



Oldsmobile generator and fan drive

Every user of aluminum pistons has had to content himself with the piston slap difficulty, and a variety of solutions have been arrived at. Probably every reader is familiar with the Packard plan of slightly offsetting the piston pin from the piston axis. Franklin slots its piston skirts lengthwise from the open end to the wrist-pin zone. This permits of a very slight clearance on the skirt, as the slots give the metal in the skirt a chance to expand without increasing the diameter and, therefore, without creating a tendency to bind.

While on the subject of piston slap it may be of interest to relate the argument of one stand attendant why his engines had never been known to develop this defect. He explained that most engines had the spark plug on the side, over the valves, and as the push of the gases started from the plug the force of



Front exhaust take-down on Nash

explosion came against the piston sideways and created a slap. In his cylinder the plug was in the cylinder head and there was, therefore, a straight down push on the pistons. This argument of the straight push on the pistons due to spark plugs in the cylinder heads has been met with repeatedly recently, probably as a result of the tendency to remove the plugs from directly over the valves to a more central position. It would seem that the scientific principle that within a closed vessel containing gas under pressure the pressure is uniform over the entire interior surface does not command much respect among car salesmen and catalog writers.

Relieving Piston Surfaces

Another tendency in piston design is to relieve the skirts of the pistons on the non-bearing sides as much as possible. This is a new application of a principle long ago established in connection with journal bearings. In the average journal bearing carrying a heavy revolving part the load is carried at the bottom. Owing to the friction the center of the load, of couse, shifts slightly to one side of the line perpendicularly below the axis of the journal. There is no appreciable load on the sides of the bearing at the level of the journal axis and it was found advantageous to relieve the bearing at both sides over a certain area, so that there can be contact between the joural and bearing only at the top and bottom. The reason why this construction gives an easier running bearing is readily explained. If the journal were in contact with the bearing all around, the film of oil which must be sheared as the journal revolves would extend all around. The oil film at the sides does not reduce the unit pressure on the lower part of the bearing and its only effect is to produce a loss due to the shearing. In a piston the conditions are exactly the same. The pressure on the piston walls is greatest along the two lines of intersection of the plane of connecting-rod swing with the cylindrical surface of the piston. From these lines the pressure eases off toward both sides and there is no pressure midway between these lines. If a thin film of oil is allowed to exist between the piston and cylinder wall at these points of no pressure or little pressure, a considerable loss of power is incurred, especially in a high-speed engine and if a rather heavy oil is used. Aluminum cylinders cast in metal molds are generally cast with relieved surfaces, and pistons cast in sand molds are now often formed with similar depressions by turning them eccentrically. Formerly pistons were generally relieved on the wrist-pin belt by being turned down concentrically. This does not give as much relief on the sides as desirable and removes some of the useful bearing surface adjacent to the maximum pressure lines.

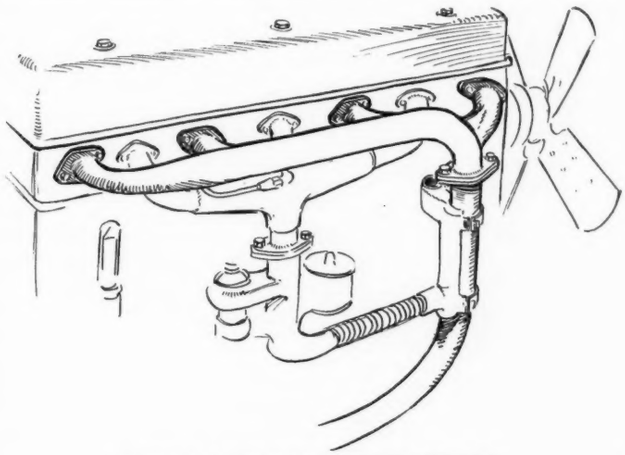
One of the perplexing problems that every designer has to contend with is that of accessory drives. The number of accessories has been constantly increasing and while there is no difficulty in finding a place and arranging a drive for each of them, there has recently been a strong tendency to clean up engines and chassis as well. It is very desirable that one drive be made to serve for two or more accessories, yet the possibility of an accident to one of these accessories interfering with the operation of the other must never be lost sight of.

Fans on Generator Shafts

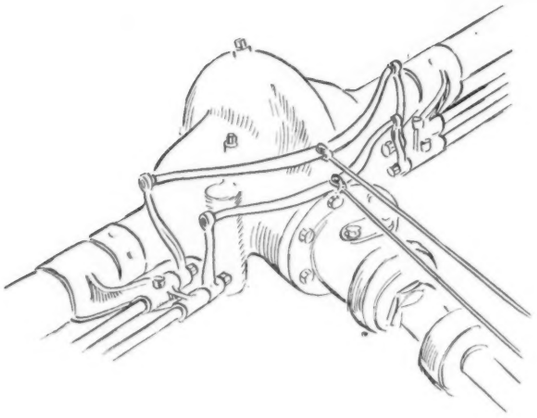
There seems to be a growing tendency to use the same drive for the generator and the fan. This practice originated with makers of eight-cylinder cars where the generator is placed in the V between the two sets of cylinders and naturally comes at about the right height for the fan shaft. It has now been extended to four and six-cylinder vertical engines. In the Oldsmobile the generator is mounted in front of the engine on a pad with a vertical stem clamped in a bracket on the cam gear housing. This provides adjustment for the belt. Nash uses a similar construction, but in this case there is a sort of base at the rear end of the generator with oblong slots through which pass clamping bolts to the cylinder block. In some instances where the fan is mounted on the generator shaft the drive pulley is in front of the fan. This results in quite a space between the fan and the radiator, which is not conducive to the highest efficiency.

Some years ago there seemed to be a tendency toward two-blade airplane type fans. The capacity of these fans in many cases proved inadequate and only a few of this type are left.

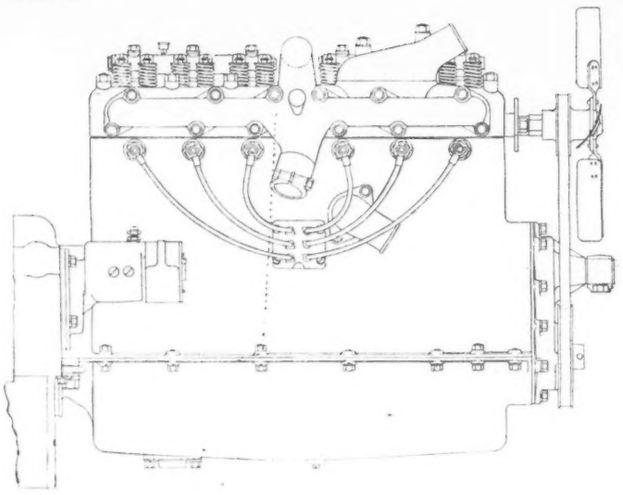
The subject of manifolds really merits an article by itself, as there are few concerns which have not changed their design in this respect during the past year. In a general way it may be stated, however, that the air heater is now not a separate part, but is incorporated in the design. Where in past years we used sheet metal or cast stoves clamped to the exhaust pipe or manifold, which connected to the carbureter air intake by a flexible tube that often ran half way around the engine, the air heater is now formed integral with the exhaust manifold and connects to the carbureter by a short length of either rigid or flexible tubing. The



Front exhaust take-down on Marmon



Neat brake equalizer arrangement on Elcar



Symmetrical arrangement of high-tension cables on Grant

hot-air tube was especially obtrusive where the carbureter was located on the opposite side of the engine from the exhaust pipe. Where this is the case the pipe is now generally carried through the space between the two middle cylinders.

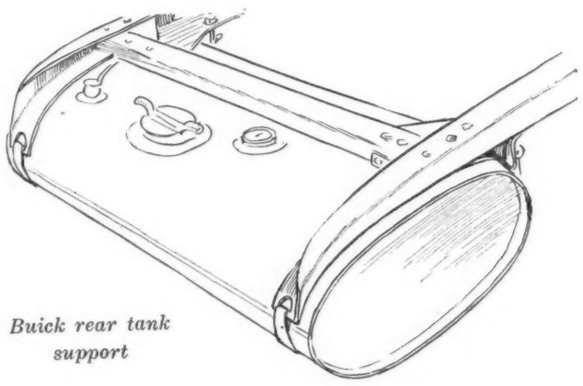
In a few cars the circulation pump and fan are both driven by the same belt. As in the case of generator and fan, the speeds of these two devices are about the same even if driven separately, and the pump combines more readily with the fan, especially in a six-cylinder car, because it occupies less space in a lengthwise direction. Some people, who had experience with early cars in which the pumps were driven off the flywheel, might object to a friction drive for this important part, but there is no comparison as far as reliability is concerned between a modern V belt in an inclosed engine space and a friction drive from an exposed flywheel at about the lowest point of the car. There is one merit in the friction drive for the circulation pump, namely, that if the latter should be allowed to freeze up it cannot be broken in cranking.

Reducing Height of Cars

The tendency toward low-hung construction continues, the incentive seeming to be chiefly a desire for more attractive appearance, though the advantages of greater safety (stability) and steadier riding qualities cannot be disputed. This year the chief change looking toward this end has been a reduction in wheel diameters. Many cars that formerly had 34-in. wheels are now equipped with wheels of 32-in. diameter. This change, of course, also conduces to economy in construction and just in what proportion the economy factor and the appearance factor share in the responsibility for it, it is hard to say. To further reduce the center of gravity of the cars the rear springs, if of the semi-elliptic type, are now generally underslung.

In recent years the unit power plant has been strongly in the ascendency. The first sign that this movement may possibly come to an end may be seen in the new Studebaker chassis. This is probably the first instance in years of a passenger-car manufacturer having adopted an admidships transmission and discarded one differently located. The reasons for this move are not far to seek. Bell housings contain a large amount of metal, which means a heavy expense if aluminum is used and great weight if—as is more customary in low and medium-priced cars at present—cast iron is the material of construction. The inclosure of the flywheel and a dry-disc clutch serves no useful purpose, but the fact that the bell housing holds the bearings of engine and transmission in rigid alignment has been an important consideration in the past. The use of a pair of universal joints between the clutch and the transmission obviates the need for such alignment, but the usual types of joints are rather complicated mechanisms and, moreover, they have a tendency to become noisy with age. Noisiness is a particular fault of the simplified types of joints, such as the Hookham joint, which the designer is tempted to use here on account of the small angularity required. So long as only mechanical joints were available engineers seemed to prefer the bell housing. Now, however, the leather or fabric type of joint has reached a manufacturing stage and seems to fit this service admirably. It is comparatively inexpensive, is noiseless and requires no attention. The advent of this type of joint in commercial form swings the balance of advantages in the direction of the separate transmission, and it may possibly return to popularity.

A little detail of construction noted on the new Studebaker is in connection with the brake pedal. Most brake pedal shanks extend substantially straight up from their hub for a certain distance and then turn forwardly to follow the inclination of the toe board. At the point of the bend a lug is formed on the shank to which the brake rod is connected by a yoke. In the Studebaker (as well as in several other designs) there is a separate arm on the pedal hub for the brake rod to fasten to, and in order that this arm need not be made very heavy it is braced to the shank of the pedal.



Buick rear tank support

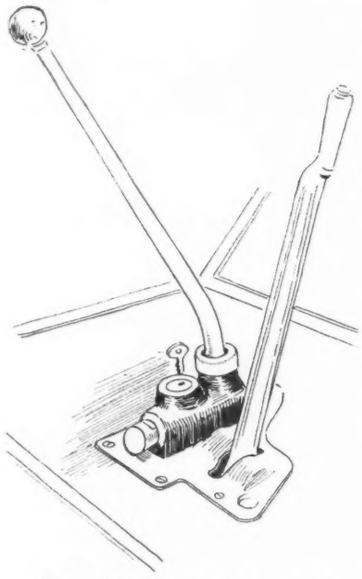
The metal in the brace is almost in direct tension when the brake is applied, and therefore works to the best advantage.

In line with the general tendency to clean up chassis design the ignition wiring in some cars has been rearranged. In some of the lower-priced cars the wires were carried from a distributer at one end of the engine to the different spark plugs across the tops of the cylinders. This involves the use of quite long high-tension cables, with corresponding chances of leakage and of trouble from electro-static effects, especially if the cables lie close together. Probably the chief objection has been, however, the unsightly appearance. This is now being attended to and the accompanying sketches of the Grant and Oakland high-tension wiring show examples of neat arrangements without the use of conduits. By placing the distributer at the middle of the length of the engine, variation in length of the different cables is reduced and a neat effect can be obtained.

Gear Lever Locks

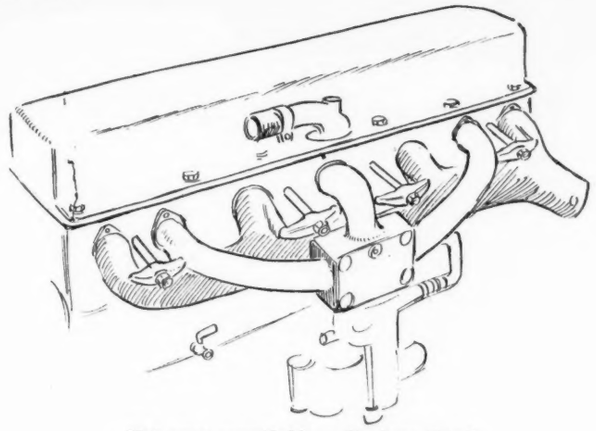
Gear lever locks are gaining. Formerly cars were locked chiefly by switch locks. However, the great prevalence of a few popular makes of magneto and battery ignition systems, and the fact that only one form of key is being used with each ignition system, make this protection rather illusory. Fuel line locks have also been developed and met with a measure of success. An objection to both switch locks and valve locks is that a skilled man can easily make connections to the engine from a separate current source or fuel supply. On the other hand, if the gear lever is locked in the neutral position, apparently the only way to move the car is to tow it.

Rear fuel tanks are becoming more numerous right along and the various methods of supporting them afford quite a study. A particularly neat arrangement is found on the Buick, where the tank is of flat oval shape and is located substantially centrally below the rear cross-member of the frame. The frame side bars extend beyond the rear cross-member and are curved downward to conform to the outline of the tank. The top flange of the side bar is cut off on a bevel beginning at the cross-member, and where it ends the web of the side bar begins to be reduced in a similar way, so that finally only the bottom flange remains. This has a slot cut through it near the end through which the steel band used to support the tank is looped. The other end of the band connects to an eye bolt which passes through a hole in the lower flange of the side bar and is drawn up by a nut. An integral gusset is formed on the side bar where it joins the rear cross-member and this gusset has a flap on it which bends up on the rear side of the cross-member and is riveted to it.

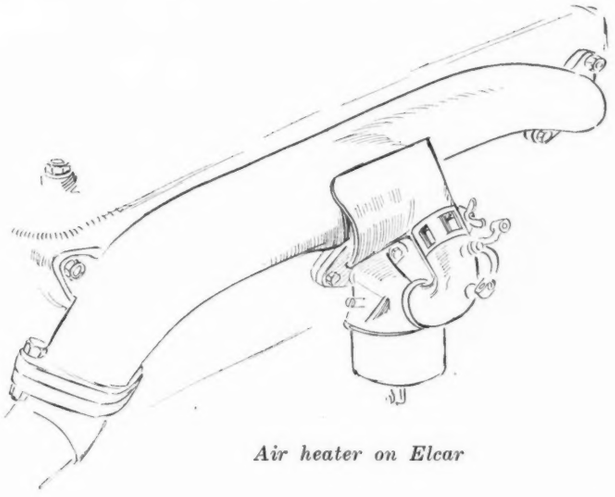


Transmission lock on Paige

It is getting to be quite a common practice to lead the exhaust manifold down at the forward end of the engine. Early instances of this arrangement may be traced back a great many years, but its development into a regular practice is quite recent. When the steering gear and exhaust manifold are located on the same side of the engine there is apt to be interference if the latter is carried down at the rear end, and this probably was the original *raison d'etre* of exhaust manifolds with front take-down. It is quite likely that such a manifold and exhaust pipe arrangement also favorably affect the engine efficiency, as the cylinder exhausts into a long pipe of large volume and excellent cooling facilities. Owen, Marmon and Nash are some examples of engines with a front exhaust take-down.



Hot spot manifold on Scripps-Booth



Air heater on Elcar

In past years one of the most annoying things on automobiles has been the fan belt. Belts will stretch and require frequent adjustment, especially if rather small in size for the work they have to do. This trouble has been partly eliminated by using more liberal belts, still the constantly varying belt tension as the belt stretches with atmospheric conditions, and as a result of wear makes for anything but ideal operation. The Buick company this year has adopted an automatic tensioning device as shown in the sketch.

Probably the most interesting exhibit to visitors of a technical turn of mind was the new Overland small car which is to sell at a popular price. It has often been said, and correctly, that at this late date it is not a difficult thing to design an automobile which shall give excellent service; the difficulty begins when it is required to design the car so that it can be produced at

(*Continued on page* 131)

Production and Economy Features Characterize New Cars at Show

Valve-in-Head Type Indorsed by Makers Who Are Using Show as Occasion to Announce New Models

By J. Edward Schipper

ANALYZING the new cars at the show, the conclusion cannot but be made that an unqualified indorsement has been placed upon the overhead-valve engine by the industry. There are five cars which have never been shown before using this type of power plant, and two others using the L-head design. One of the latter, the new Overland Four, is not as yet in production, and probably will not be for some months.

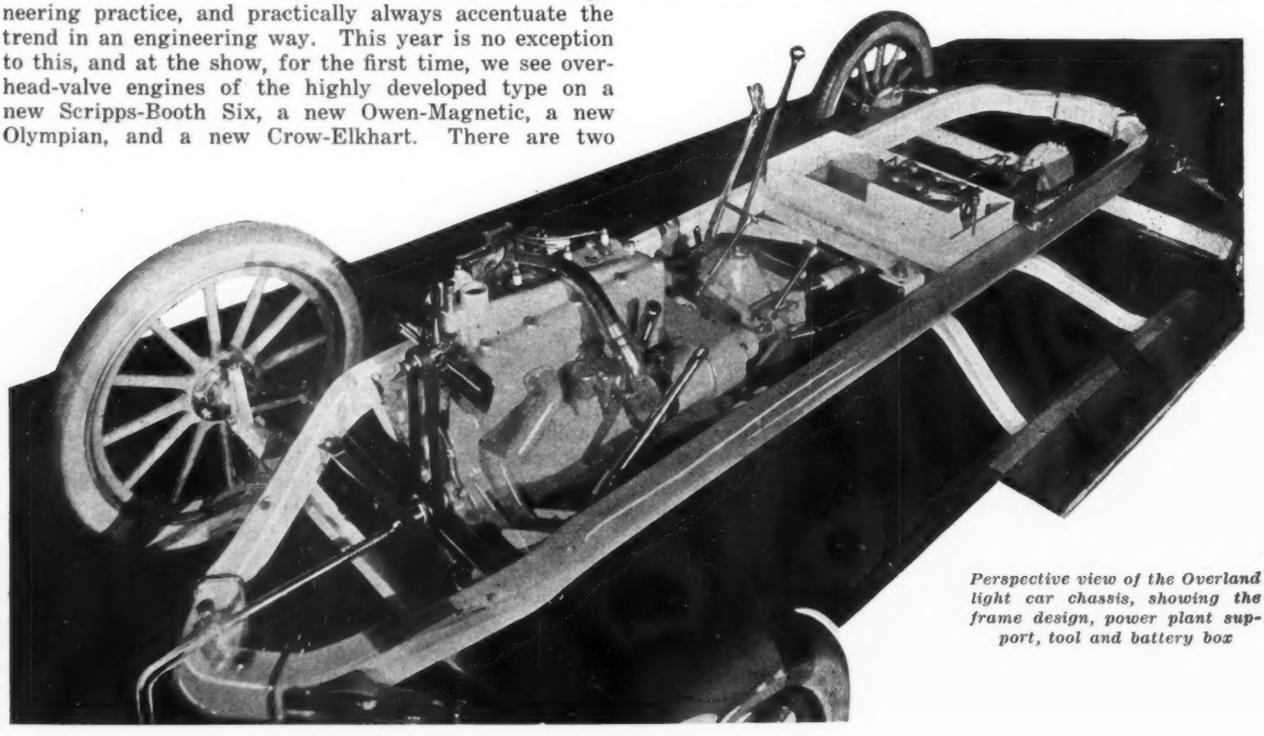
Of the new cars present there is no doubt that the Overland Four takes a prominent position in general interest because this is a car which Willys-Overland is soon to launch in competition with the Ford. Its price has not been fixed, but it is understood that it will be on a competitive basis with the Detroit product. Consequently, it is designed to be made on a highly organized production basis in order to bring the possible selling price down to the lowest limit.

Surprises Not Numerous

While the number of show surprises is not nearly so great as in former years, the new cars have a more significant value. New cars are, in nearly all cases, the results of careful study, particularly as regards the possibilities of placing them on the necessary class-production basis. These cars are also indicative of the latest engineering practice, and practically always accentuate the trend in an engineering way. This year is no exception to this, and at the show, for the first time, we see overhead-valve engines of the highly developed type on a new Scripps-Booth Six, a new Owen-Magnetic, a new Olympian, and a new Crow-Elkhart. There are two L-head engines, both of them on low-priced cars, the new Overland Four, which will probably sell for close to $500, and the Moore 30, at $695.

In addition to the new cars there are always new bodies added to present chassis, and exhibited for the first time. This is particularly true this year, where a surprisingly large number of new bodies has been added as sales stimulation. Hupp is now exhibiting its complete line of closed bodies on its new chassis. Oldsmobile shows a new sportster. Cole exhibits its bevel-edged bodies for the first time. There are a new Liberty limousine, a new Elgin sport model and a convertible sedan. McFarlan has a sportster of rather extreme lines. There are also a great number of special show bodies which are not regular products, but exhibit cars.

Besides the cars which are new throughout, either in chassis or body, there are a great number which incorporate refinements made within the last few weeks. This is the case, for instance, on the Winton, where a new water-jacketed intake manifold is fitted, and on the steam cars, both Stanley and Doble. The Stanley car has a number of important refinements in the piping, and on the Doble the fan is now operated by a small impulse turbine of the velocity type, actuated by exhaust steam. The Peerless cars now have L-head engines in place of the



Perspective view of the Overland light car chassis, showing the frame design, power plant support, tool and battery box

overhead-valve type, although otherwise the design is quite similar. This is one example where a manufacturer has gone from the valve-in-head to the L-head engine. This change is to a great extent due to the advantages of construction on the V engine.

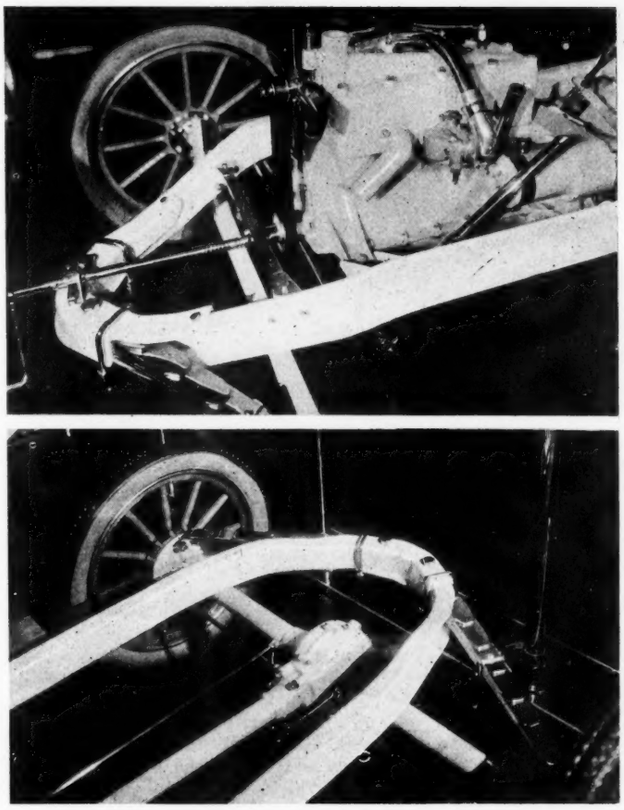
Willys-Overland Exhibits Forerunner of Low-Priced Product

Will Be a Big Production Car with High-Grade Engineering Features

THE Willys-Overland big-production, low-priced Four, shown for the first time three months ago at the Toledo factory in chassis form to a few inside observers, is exhibited as a chassis and an unfinished body. Its predominating feature from a construction standpoint is the skillful use of pressed steel in both chassis and body. Everything possible is made as a pressed part, giving the desired lightness and low cost. Another feature is the extension of the chassis suspension forward of the front axle and behind the rear axle by the means of an overhanging form of spring arrangement.

The result is that the Willys-Overland company has produced a 1500-lb. car on a wheelbase of 100 in. with the equivalent of 130 in. in spring suspension. The frame side members are long pressed steel parts, spaced quite closely, the distance from the inside of the channel side on one side to the inside of the opposite channel being 23 in. The depth of the channel member is 31.2 in. and the width across from the outside of the channel flange on one side to the outside of the channel flange on the other is 26 in. These side members are rounded off front and rear so that the form of the chassis frame is what might be roughly called a flat sided, narrow, continuous ellipse, the ellipse itself being 130 in. from end to end.

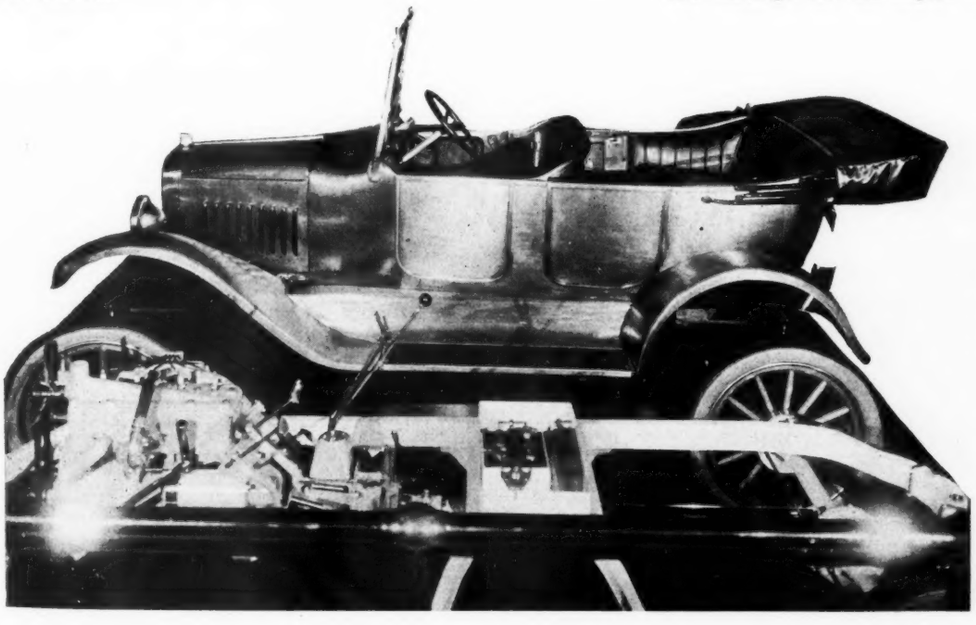
As the wheelbase is 100 in., the front and rear axles are both 15 in. in from the ends of the frame, this amount being represented by the overhang of the chassis. The springs are mounted in such a way as to connect the overhanging ends of the frame to the axle, this being accomplished by a horizontal V-type of suspension at both front and rear. The front springs being fixed at both the frame and axle and the rear springs being shackled on one side and pivoted on the other to take care of the movement of the body, thus the front axle member is relied upon to absorb directly the spring stresses by slight movements of the front axle from the vertical.



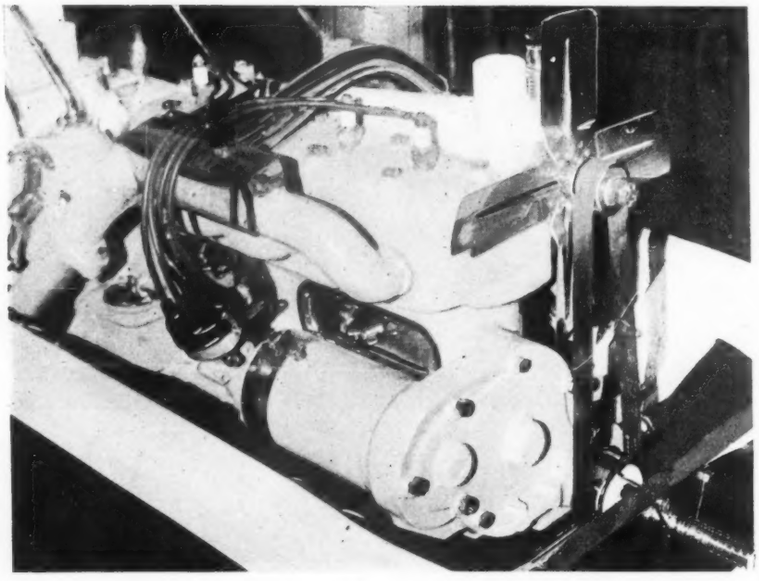
Front and rear ends of Overland light car chassis

Outside of the radical departure from usual practice in the arrangement of the frame members and suspension, the Willys Four does not depart from standard design in its other features. A conventional type of block L-head four-cylinder engine is used with dimensions of 3¼ by 4 in. The valves are operated from a gear-driven camshaft through mushroom push rods. Cooling is by thermo-syphon and oiling by a pressure-feed system in which the oil is thrown by centrifugal force by the flywheel through an oil strainer and then to a lead to the hollow crankshaft. The hollow shaft also takes care of the lower connecting rod bearings.

The castings for the engine are arranged in accordance



Sheet metal body alongside of chassis of Overland light car. The ensemble is surrounded by a railing to keep the crowds at a distance



Four-cylinder L-head engine for the new Little Four Overland

with practice in L-head design. The head is removable and the cylinders are cast in unit with the upper half of the crankcase. This casting also carries the motor supporting feet at all four corners, giving a four-point rigid suspension. The water jackets are large, and in connection with a cellular tube radiator with a large tank at the top the cooling system hold a total of 7 gal., which is much larger than that employed in cars of far greater size. In connection with this radiator there is a fan driven by belt from a gear on the end of the crankshaft, and the tension on this belt is constantly maintained by a spring.

A complete electrical system is employed. The units are the Auto-Lite for starting and lighting, and the battery equipment may be either U.S.L., Gould or Willard. The battery capacity is 60 amp.-hr. The motor and generator are mounted separately, the generator being on the right side and driven directly from the timing set, while the starting motor is on the left and is engaged with the flywheel by the Bendix gear.

Unit Powerplant

The clutch and gearbox are mounted with the engine as a unit powerplant. The clutch is an oil disk, having three disks faced with Raybestos. It is housed within the flywheel and secures its oil from the engine, the same oil lubricating the entire unit plant, flowing back also to the gearbox, which is a three-speed, sliding, selective. From the gearbox the drive passes through one universal joint to the propeller shaft and thence to the three-quarter floating rear axle. This axle is a single bearing floating type with a ball bearing pressed over the outside of the axle housing, carrying the wheel, and a roller bearing at the differential end. The wheels are wood, carrying 30 by 3½ tires, non-skid in rear. Propulsion is through a torque tube.

Two sets of brakes are used, the foot brake being mounted on the jackshaft, giving a transmission brake, with the hand brake on at the rear wheels. The control members for operating the brakes and controlling the other functions of the car are placed in the customary manner.

The body is a production job as well as the chassis, being pressed steel throughout. The type shown is a five-passenger job and arranged with an apron-like projection in the front and a rounded off rear to accommodate itself to the overhanging frame suspension. The running boards are supported from the chassis by two inverted pressed steel U-bars riveted to the frames, giving a substantial support to these boards. The color of the body is not fixed, and there are some other details which are also to be settled upon before the car is put into production. For instance, the gear ratio on the model shown is 4.73:1. This may be altered, and the color is not as yet fixed upon. It is expected that a definite move toward production will be made during the coming spring.

Scripps New Six Has Northway Overhead Valve Engine

First Appearance of This Make as a Five-Passenger Touring Car

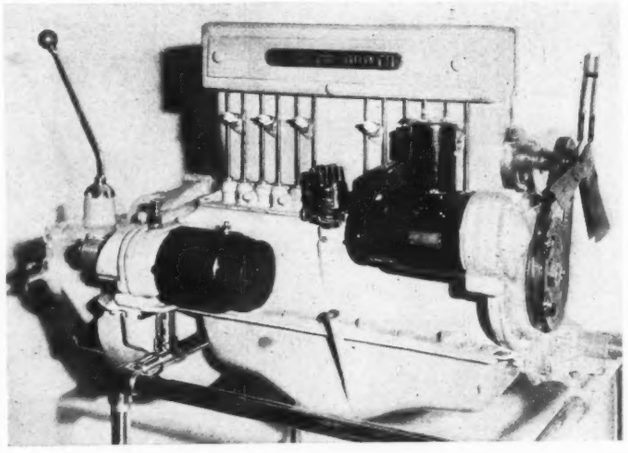
FOR the first time the Scripps-Booth car appears in six-cylinder, five-passenger form. The familiar body lines which have created a name for distinctiveness remain, although they are modified to accommodate them to the new touring model. The new Scripps design is due without doubt to the definite inauguration of this concern as a part of the General Motors Co., and General Motors units displace the parts which were formerly purchased elsewhere. This is particularly true of the engine, which is now the Northway overhead valve six.

The new car which is sold as a five-passenger for $1,195 is mounted on a wheelbase of 112 in. It is equipped with a 2 13/16 by 4¾ unit powerplant, having its six cylinders cast in block, with the valves operated from a single camshaft which actuates a set of exterior side rods and then an overhead rocker arm valve set. The cylinder heads are detachable and are held in place by long studs, and there is in addition a coverplate which incloses the valve action in order to give dust-proof qualities and silence.

The intake manifold on the new engine employs the hot plate principle in order to aid in the evaporation of the mixture. The manifolds are on the right side of the engine, and the exhaust from the two central cylinders is directly against the portion of the manifold around which the intake gases are led. The carbureter is a Marvel, and is provided with a full hot-air intake so that both the primary air and the mixture are subjected to the high exhaust temperatures.

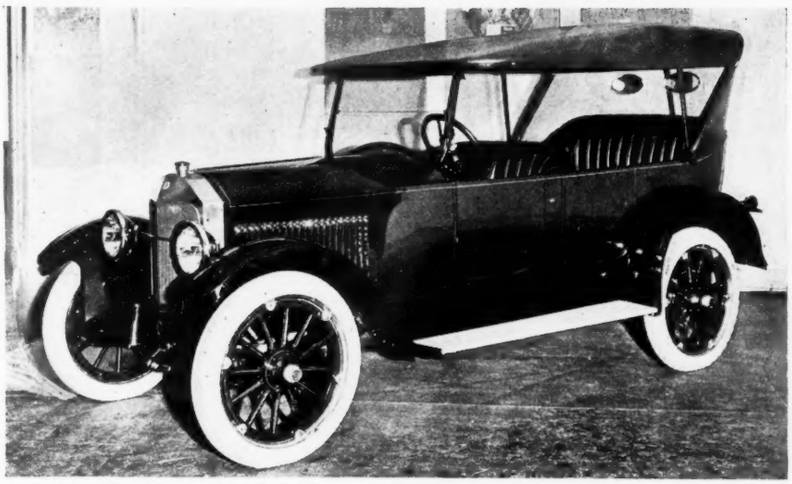
Pump on Fan Shaft

Pump cooling is used, the water pump being driven off the fan belt, as both the fan and pump are on the same shaft. The belt is a notched type to give positive drive. The fan is what is known as the biplane type, being a three-blade unit, with each blade having two parts parallel to each other in the form of a biplane. Starting and lighting and ignition is by the Remy system, and the oil feed is by means of a Stewart vacuum tank in connection with a rear gasoline tank.



Scripps is now using the Northway valve-in-head six-cylinder engine

Power is transmitted through a clutch faced with leather, having an aluminum cone with spring insert. The gearbox is a Warner-Munsey type, with ball bearings on the main shaft and plain bearings on the lay shaft. The propeller shaft has two universals, and the drive is by the Hotchkiss system in connection with semi-elliptic springs. In addition to the equipment mentioned the list price includes Marshall upholstery springs and a Stewart speedometer.



Five-passenger touring car mounted on the new Scripps six-cylinder chassis

New Olympian Uses Brush Deep Frame Chassis

Has Overhead Valve Engine—Light-Weight Construction Features New Product

THE Olympian Motor Car Co. of Pontiac, Mich., is exhibiting the first of its new cars. This is a new design throughout and incorporates Brush features such as the valve-in-head engine, deep frame construction in which the side members are formed by the splash apron and the running boards are also part of the frame structure, the full circle housing on the rear axle and the related features which go with this type of construction.

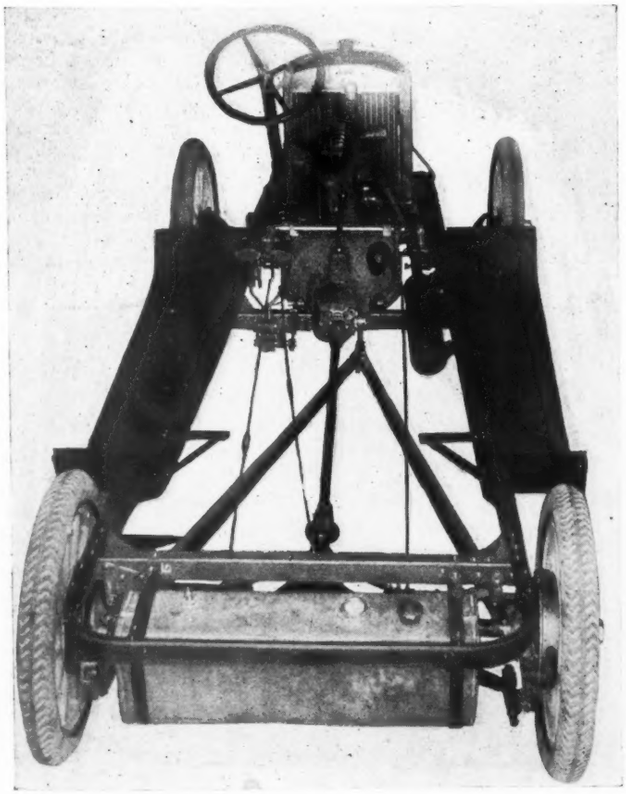
In addition to these features the drive units have been made stiffer by a triangular layout composed of two torque arms coming together at their forward ends, so that an equilateral triangle is formed by the two torque members and rear axle.

Mounted on a wheelbase of 112 in. the body is typical of up-to-date expression in economy of space. The cowl is so arranged that it takes up but little room, and the gearshift lever is brought out from beneath the cowl with a bend which carries it directly to the hand of the operator. In place of the ordinary type of hand brake there is a handle which operates on a pull rod through the dash so that the manipulation of the hand brake is rendered exceptionally easy and accessible. A clear aisle is left across the width of the front seat by this arrangement of levers, so that in spite of the reasonable length of wheelbase there is more than a normal amount of room both front and rear.

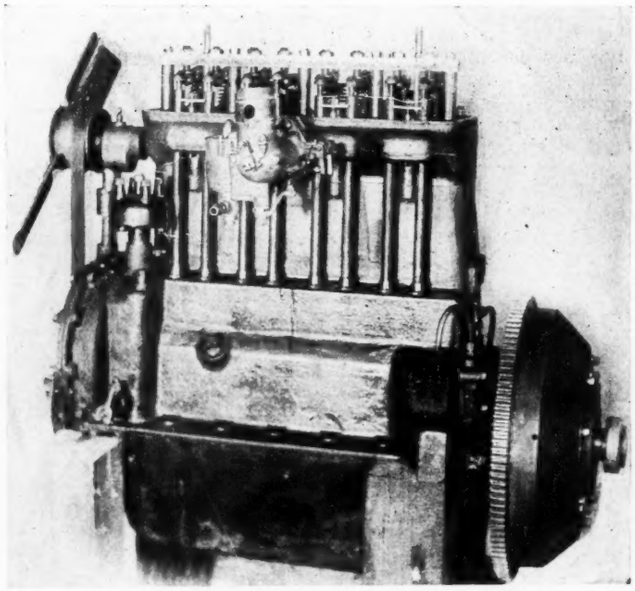
The powerplant is comprised of a four-cylinder engine, Borg & Beck clutch and a three-speed ball-bearing gearset mounted as a unit. The engine is a 3¼ by 4½ block four, with detachable head carrying the Brush overhead valve gear, which is so designed that adjustments on the valve clearance can be made while the engine is running. An improvement has been incorporated in the valve action by using a full generated rocker pivot.

Aluminum alloy pistons, Lynite, are used. These have a length of 3 9/16 in. and a diameter of 3.24 in., with 3 3/16-in. rings. They are fitted with a 1-in. wristpin, which forms the upper bearing for the 8½-in. drop forged connecting rod, which has a crankpin diameter at the bottom end of 2¼ in., with a 1½-in. length.

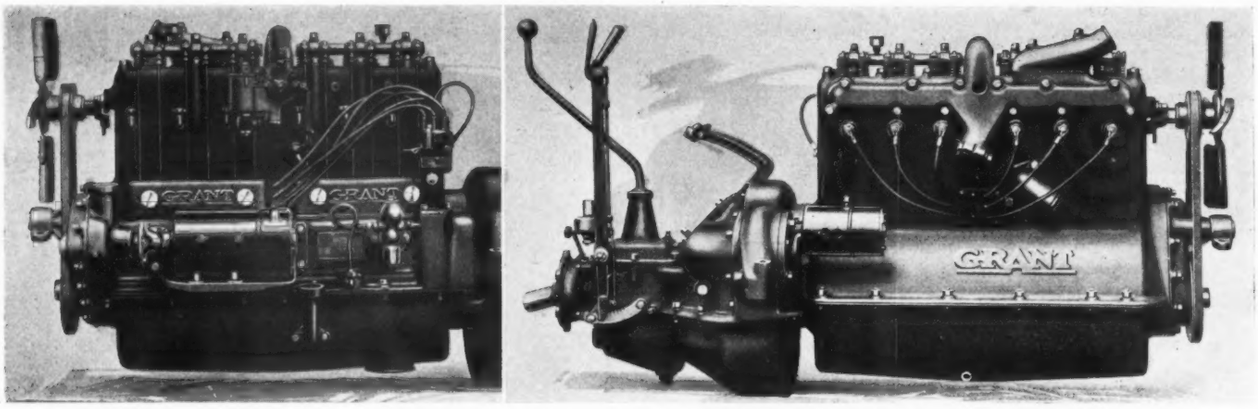
The 100-lb. flywheel carries an 8-in. diameter Borg & Beck dry plate clutch. The flywheel itself has an exterior diameter



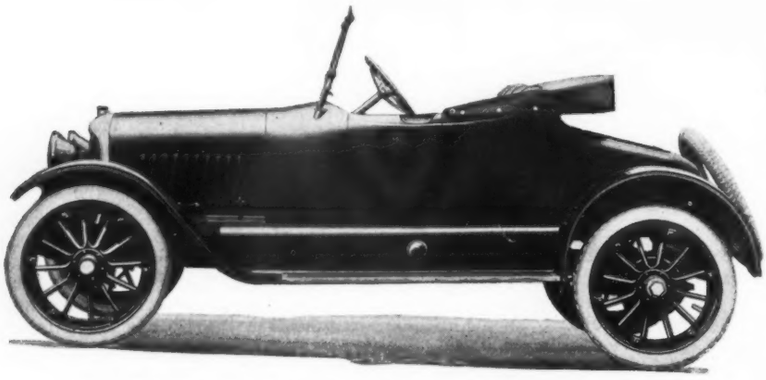
Olympian chassis with deep frame construction. Note continuous frame bumper at rear



Overhead valve engine adopted for the Olympian car, showing top cover removed



Both sides of the refined Grant powerplant, which is a typical overhead valve six



New Grant roadster, with sloping windshield and rear deck

of 14 in. From this unit the drive is transmitted through a three-speed gearset unit mounted on S.K.F. ball bearings on the main shaft and plain bearings on the countershaft. Both these shafts are 3½ per cent nickel steel. The gear ratios provided are 3 to 1 on low, 1.89 to 1 on intermediate and 1 to 1 on high—the reverse ratio in the box is 3.62 to 1. For final reductions these are all multiplied at the rear axle by 4¾ to 1.

The propeller shaft has two universals and is relieved of torsional stresses by two pressed steel torque arms previously described. The rear axle is a three-quarter floating mounted on Hyatt bearings with a circular type of differential housing to which the tubular shaft housings are bolted on either side.

The body is a five-passenger double cowl streamline type with slanting wind-shield. It is built in the Olympian shops and follows the somewhat angular line now in wide use. It is equipped with an electric light in the rear right hand door for lighting the tonneau and entrance. There is also a two-passenger design of individual lines. The equipment includes a Boyce Moto-Meter, Stewart-Warner speedometer, bumper and a complete set of tools. The price is $1,085.

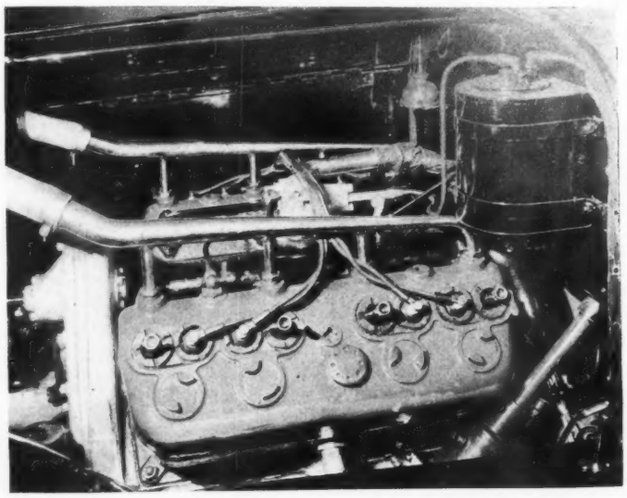
Grant Changes Give Higher Speed Engine

Refinements Made Throughout Body and Chassis Giving Increased Accessibility

IN general design the 1918 model Grant chassis is very much the same sort of machine as its predecessor, but in details there are numerous and important differences. The six-cylinder engine has the same dimensions, 3 in. bore by 4¼ in. stroke (180.3 cu. in.), but changes in design enabling it to run at higher speeds have increased the horsepower. The waterjackets now extend all the way down the cylinders. Filler plates now are placed between the engine crankcase and the frame, thus excluding dust and mud, and to further protect the valve mechanism against excessive wear the valve lifters at the base are covered. The latter are also made lighter than formerly.

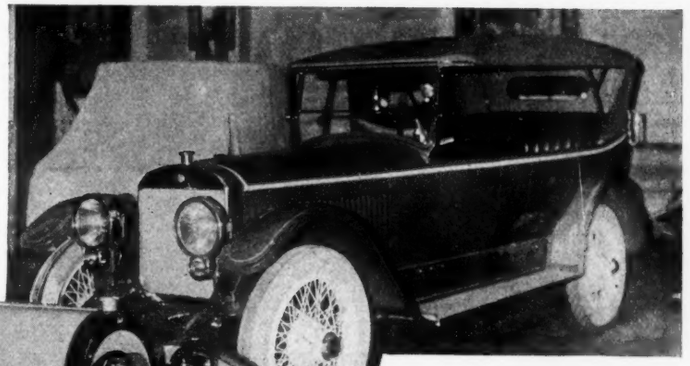
A much cleaner appearance of the engine results from the replacement of the old wiring system in which the wires were carried above the cylinders by a new one in which the wires are supported in fiber blocks between the cylinders. This change also reduces the length of the wires and thus improves ignition. The flexible hot air tube formerly used, together with the hot air muff, has been eliminated, the place of these parts being taken by a permanent hot air tube extending from the carbureter over the top of the cylinders directly to a hot air box cast in the exhaust manifold.

Practically all of the bearing surfaces have been increased in size. That portion of the crankcase supporting the bearings has been reinforced, the generator bearing shaft has been increased in length and an oil guard provided to prevent leakage. A V-type fan belt with a simple adjustment is used, and the fan is driven from the crankshaft instead of from the general driveshaft. The lubricating system is entirely new. First the oil pump capacity has been multiplied four times and the oil flow is shown by a gage on the dash instead of by the feed oiler heretofore used. The breather tube and oil filler are now combined and are placed in an

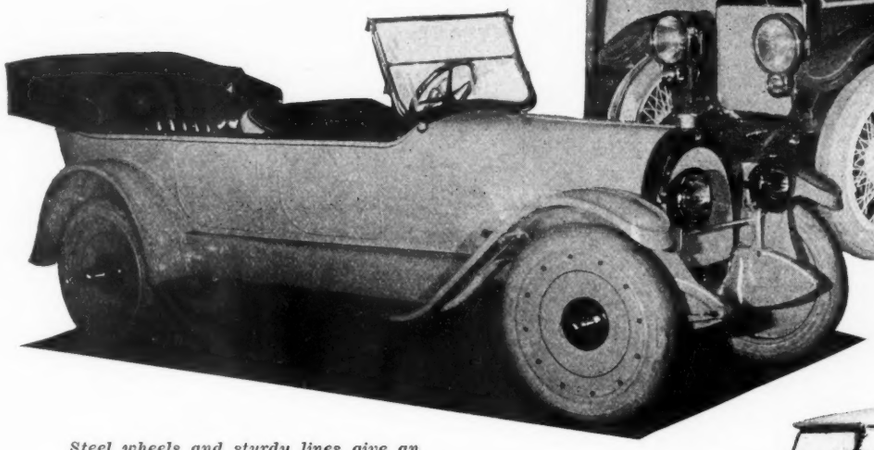


New Peerless L-head engine which takes the place of the former I-head

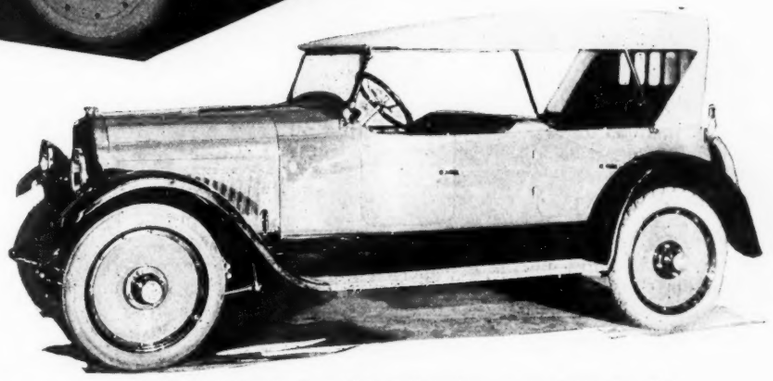
Military Lines Characterize Models at New York Show



Here is a special built-to-order model of the Winton which has a higher radiator than the standard job and straighter lines

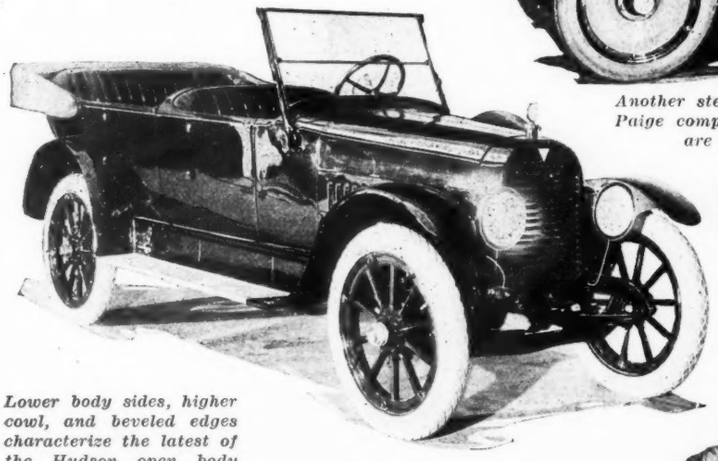


Steel wheels and sturdy lines give an armored-car appearance to the 7-passenger Oldsmobile which is finished in azure blue and sells for $1,700

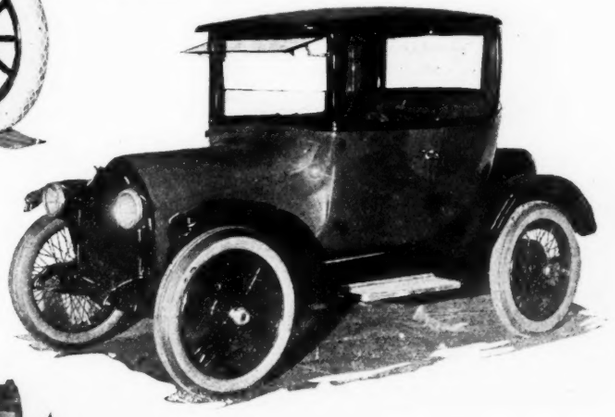


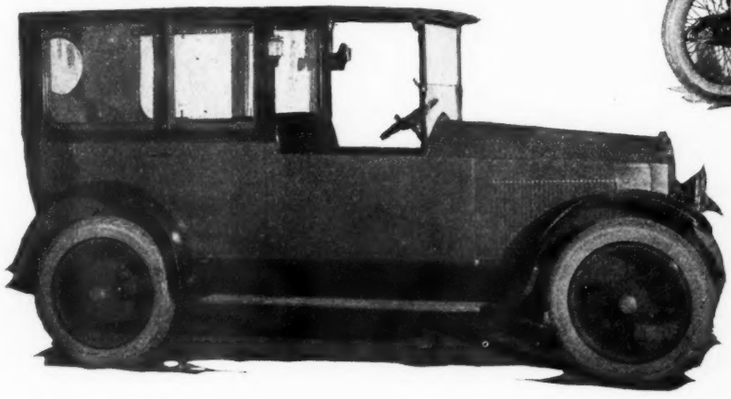
Another steel wheel model at the show was shown by the Paige company. The slanting windshield and one-man top are other up-to-date features of this product

One of the Detroit-Electric broughams is shown below. The body appointments of this line are of the highest grade

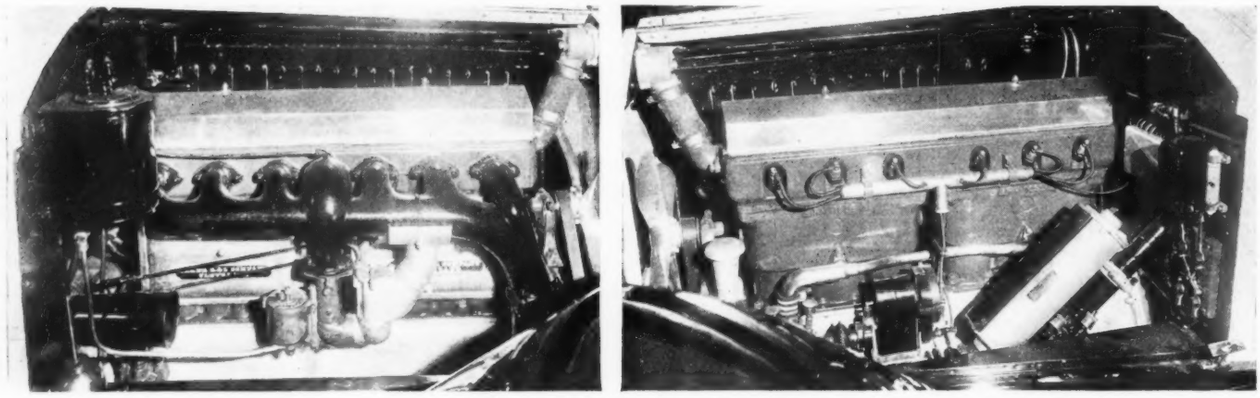


Lower body sides, higher cowl, and beveled edges characterize the latest of the Hudson open body models, known as the phaeton





Milburn electrics are being built this year with speed especially in mind. The limousine at the left is built to go over 25 m.p.h. if desired



Both sides of the new Owen-Magnetic overhead valve six made in the shops of the Baker R. & L. Co.

accessible position on the gearcase. The oil strainer has been made larger and may be readily removed for cleaning. Internally the distributing system comprises a tube within the crankcase containing a small opening opposite each connecting-rod and in the gearcase, flooding each bearing surface with oil. Unequal lubrication is rendered more difficult by the use of a new oil trough pan.

Vacuum Tank Attached to Dash

The Sparks-Withington vacuum tank is now attached to the dash instead of to the engine, rendering all parts of the motor head accessible. A Stromberg carbureter is still used, with slight changes.

A two-unit Wagner starting system is used in an improved form. The starting motor is now arranged with a flange bolted to the engine arm, rendering it possible to completely inclose all working parts, including the flywheel, Bendix pinion shaft and starter spring.

The Remy automatic advance type ignition distributer has been removed from the vertical drive shaft and placed upon a short shaft, eliminating a large number of parts. The spark control mechanism works independently of the timer and the timer cap, so that the timer as a whole remains stationary. This decreases the possibility of loose wires due to the former constant motion of the timer.

The gearbox and clutch are of the same general design, one important change being the provision of a method of lubricating the clutch throw-out bearing. This now receives oil through a hole in the constant mesh pinion gear.

Semi-Steel Castings for Gearbox

Semi-steel castings replace the heavy drop forge arms formerly supporting the gearbox. These are bolted permanently to the engine and support the gearbox. A pressed steel underpan covers the lower half of the flywheel, effecting complete inclosure. A large hand hole however is provided for inspection and adjustment of the clutch and if necessary this steel underpan may be quickly dropped.

Among the other changes are an increase in the throw of the emergency brake lever, permitting more power and action, though the brake construction remains practically the same. The starting switch is now mounted on the gearbox and so made that it requires but a light pressure for operation. A split nut type Jacox steering gear replaces the worm and gear Jacox formerly used, and the horn button is now carried on the top of the steering wheel.

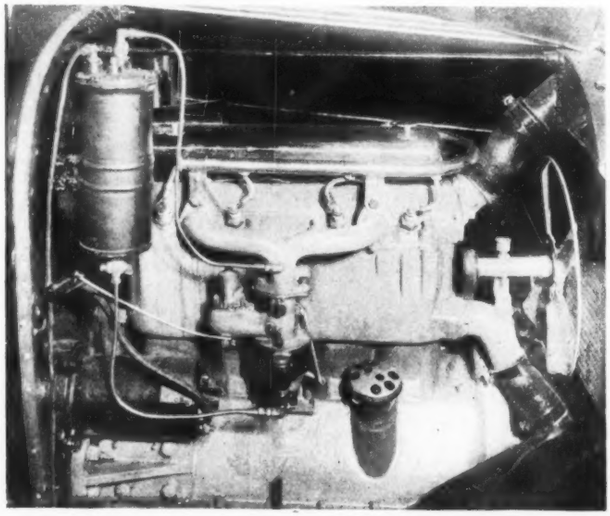
Though the rear axle is similar to the one formerly used the factor of safety is increased by the use of better steel and gears with larger teeth.

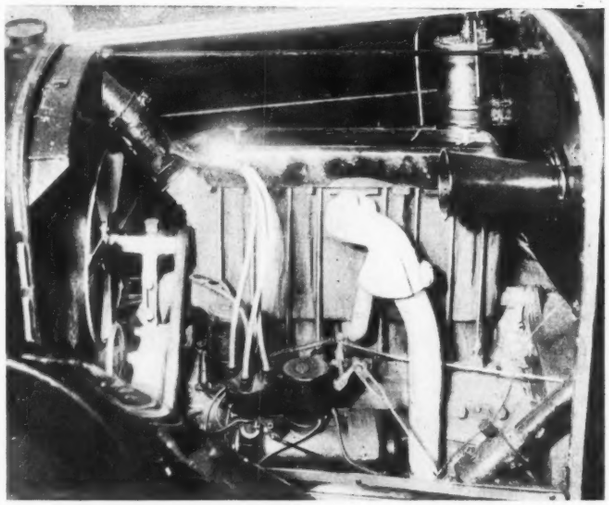
Body Dimensions Increased

An increase in the wheelbase to 114 in. has permitted an increase in the body dimensions. The rear springs are 8 in. longer than formerly. An entirely new design of radiator is used, somewhat higher and narrower than the previous one and of reinforced double shell construction permitting ready removal of the core. It is mounted on trunnions permitting it to adjust itself to any weaving of the car frame. Its cooling capacity has been increased and the shell is nickel plated.

In 1918 the Grant will be offered in five bodies at the following prices:

Five-passenger touring car	$1,055
Three-passenger roadster	1,055
Five-passenger detachable Sedan	1,350
Five-passenger all-weather Sedan (Springfield type)	1,595
Three-passenger standard all-weather coupe (Springfield type)	1,575





Overhead valve engine adopted by the Crow-Elkhart Co. and made in the Crow-Elkhart establishment

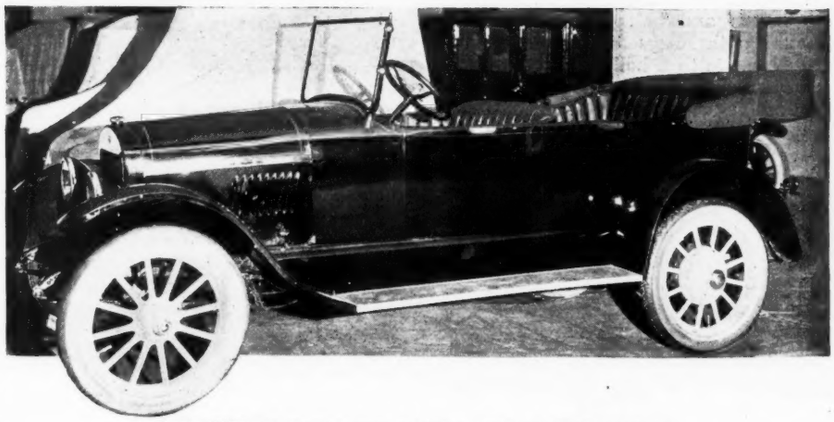
Anderson Has Convertible Sport-Touring

Gives Both Two- and Five-Passenger Bodies

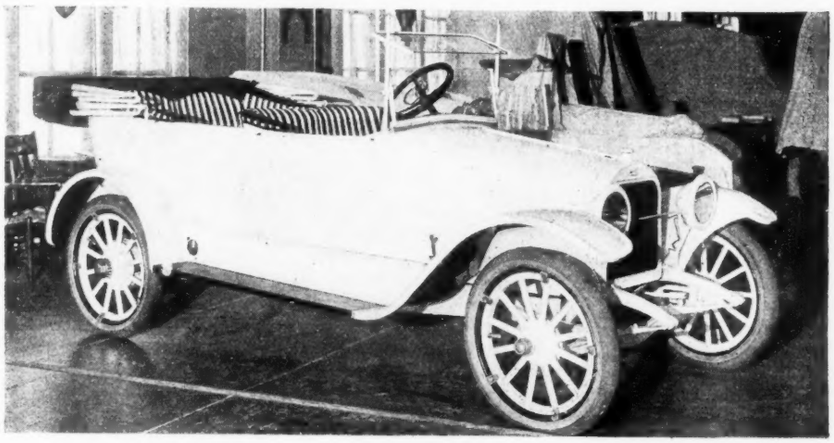
THE Anderson Motor Company of Rock Hill, S. C., has a new car at the show in the shape of a convertible sport model which may be transformed from a roadster to a five-passenger model. The rear compartment can be closed over, thus forming a rear-deck roadster, or when it is opened it uncovers a rear compartment which allows of three additional passengers. This convertible model comes in two styles, one with divided front seats and the other with a solid front seat and entrance to the rear compartment through a door at the rear on the right side of the car. The convertible feature of the car is patented by the Anderson company.

The convertible model with the rear door is a larger type than the one with the divided front seat and is known as the De Luxe. The engine is larger in this model, being the new Continental 9 N, 3½ by 5¼ in., six-cylinder type. The other features of the car are similar to the standard Anderson product. The clutch is a Borg & Beck, the transmission is a three-speed selective and the rear axle a Columbia.

One of the interesting features of the De Luxe convertible is the method of top adjustment for the roadster. There are two pillars which are concealed in the body just behind the front compartment and a curtain top which pulls over the front compartment on a spring roller. The De Luxe convertible sells for $1,925, the convertible sport $1,465, four-passenger $1,465 and the sedan $2,165.

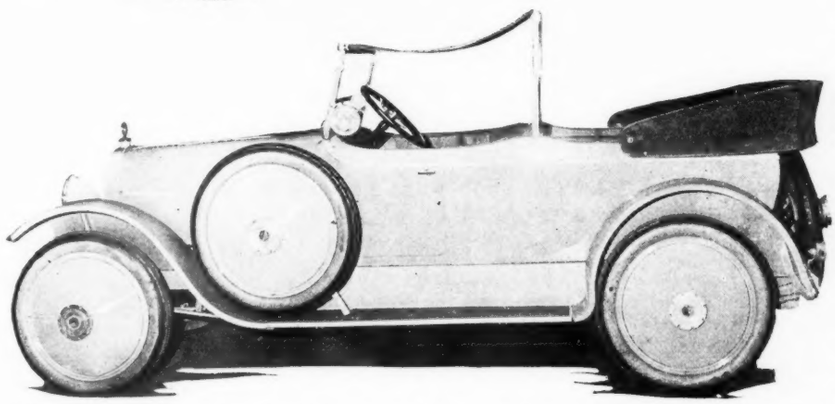


Crow-Elkhart touring car, showing lines of stock product



Moore Thirty, which is one of the new low-priced products at the show

New Deering Magnetic, characterized by ultra - modern straight lines



Anderson is showing a convertible sport model giving both two- and five-passenger capacity

Templar Exhibits Its Product for First Time

Has Four - Cylinder Overhead Valve Unit of 197 Cu. In. Displacement

A NEW car with a new design of overhead valve engine is being exhibited by the Templar Motors Corp., Cleveland. The car is an assembled product with the exception of the engine, which has been designed in the Templar shops and will be built by the company itself. The engine is a four-cylinder product of 197 cu. in. piston displacement and is claimed to develop 43 hp. at 2200 r.p.m.

The powerplant is a detachable head unit with 3⅜ by 5½-in. cylinder dimensions. The valve action is a rocker arm type with the rockers covered by an aluminum housing. The vertical push rods operate in a hollow space which is so arranged that there is a continuous oil vapor from the crankcase surrounding the valve action and keeping the parts lubricated. The valve rocker shaft is part of the pressure oil feed system.

The clutch is a Borg & Beck single dry plate with multiplying levers and ball bearing release. The drive is taken through a three-speed gearbox operating on New Departure ball bearings to a hollow propeller shaft with two Schwitzer universals and a semi-floating American Ball-Bearing Co. rear axle. The springs are semi-elliptic front and rear, the length being 54 in. in the rear and the bushings are Nigrum oil-less type. The tires are 32 by 4 Goodyear Cord, straight side. The five-passenger and the four-passenger sell for $1,985, the four-passenger for $2,155, and the two-passenger touring-roadster for $2,255.

Owen-Magnetic Refined with New Overhead Valve Engine

Chassis Is 6 In. Longer, Now 142-In. Wheelbase —Improved Body and Better Equipment —Price Raised $1,000

A NEW Owen-Magnetic is on exhibition for the first time. In body work it is probably one of the most distinctive types at the exhibition and carries out to a marked degree the tendency toward the beveled edge. The hood lines are beveled, as are the side rails of the body, and this effect is carried around to the rear end, so that it finishes off in the same angular style as characterizes the rest of the car. The price of the car with this new body is increased $1,000 over the former price, being now $5,475 as a touring car and $6,500 as a limousine. These prices are delivered in New York and include the war tax.

Mechanically the most important development is in the use of a new overhead valve engine. There is also a better control, which more uniformly graduates the intermediate steps in speed control. The new control apparatus also permits of a better braking action by allowing the current of the motor, acting as a generator, to increase the field strength of the electrical driving unit, thereby giving an increased drag on the armature for more severe braking.

Car 6 In. Longer

The new car is now 6 in. longer in wheelbase, being 142 in., as compared with 136 last year. This is made necessary by the rearranged body and larger engine. The new engine is a 4 by 5½ overhead valve six, with the cylinders cast in two blocks of three, the overhead valve construction being carried on a single detachable head which fits both cylinder blocks. The engine is capable of delivering 80 hp. on the brake, according to the claims of the makers, and is manufactured specially for the Owen-Magnetic cars in the Baker R. & L. shop.

Both the upper and lower halves of the crankcase are aluminum castings. The upper half is a ribbed structure stiffened to support the main bearing and to carry the crankshaft load. The latter not only must perform the usual duties but must also support the revolving member of the magnetic clutch, forming a part of the transmission, which acts in place of the conventional flywheel. The pistons are ground and lapped into the cylinder and drive through drop-forged, oval-section connecting rods.

The camshaft and the water pump and magneto shaft are driven from the crankshaft by means of a timing set composed of three helical gears inclosed by the aluminum cover. The valves are tungsten steel, 1⅞ in. in diameter, and are used in connection with the overhead system carried in the detachable cylinder head. They are operated by drop-forged rocker arms and push rods entirely inclosed by cover plates. These rods can be adjusted by removing the single aluminum top cover running the full length of the detachable head.

The exhaust from the engine is led by the manifold to the forward end and the exhaust pipe curves down from that point below the body, thus keeping the heat away from the front compartment. The intake and exhaust manifolds are both on the left side, and the intake passages are arranged so that the single connection to the carbureter is cast integrally with the exhaust manifold and passes through it. This gives a highly preheated mixture and aids in the vaporization of the fuel.

Gasoline is fed by the Stewart vacuum system, and ignition is by a Bosch high-tension magneto. Lubrication is by pressure feed, with the gear pump supplying the lubricant under a head of from 20 to 30 lb. at normal running. The pressure is proportional to the power requirement, and the oil under pressure is taken directly to the camshaft rocker arm bearings and timing gears besides the bearings directly concerned with the operation of the crankshaft. Cooling is by centrifugal pump, the pump being on the same shaft as the magneto. A Sylphon thermostat is located at the upper tank of the radiator, checking the flow of the cooling liquid through the radiator by means of a bypass until the proper running temperature has been reached.

There is no alteration in the electrical system other than in the control unit mentioned. The chassis frame has been strengthened to support the longer wheelbase and is now 8 in. deep, of pressed steel channel section, provided with many stiffening cross-members and gussets. Although the wheelbase is 142 in., the turning radius is but 24 ft. The rear springs are now 61 in. long and are underslung. The standard rim equipment is Firestone straight side, and the tires are 35 by 5 in. cord, with ribbed front and non-skid rear.

Crow-Elkhart Building Own Overhead Valve Engine

Former Type Supplanted by I-Head Engine and Unit Powerplant Replaces Axle Unit

CROW-ELKHART is showing for the first time its revised car employing its own new valve-in-head engine. The engine is a rocker arm type, four-cylinder 3½ by 5, with a counterbalanced crankshaft having the counterweights electrically welded into place. The new car contains several changes in practice as compared with previous Crow-Elkharts. In the former L-head engine a two-bearing crankshaft was used, whereas in the new type there is an additional bearing.

Oiling is now by splash pressure, cooling by thermo-syphon and in place of the three-quarter elliptic springs, semi-elliptics are employed with a frame extension to take the place of the quarter which has been removed. Another big change is the abandonment of the rear axle gearbox and the substitution of the unit powerplant. In place of the clutch formerly made by the Crow-Elkhart company the Borg & Beck dry disk type is being used and in place of a cowl gasoline tank the tank has been moved to the rear and Stewart vacuum feed employed. Other detail changes have also been put into effect such as a sloping windshield in place of the vertical, a curved cowl, lower seats in the front compartment and twelve varieties of color offered as stock. The five-passenger touring car sells for $935, the De Luxe touring at $995, De Luxe roadster, $995, coupe, $1,295 and sedan, $1,395. For $100 extra a complete set of Houk wire wheels is supplied. The upholstery is either in Spanish brown or black long grain leatherette.

Moore Car Is New Assembled Unit

Employs Standard Parts Mounted on a 106-In. Chassis

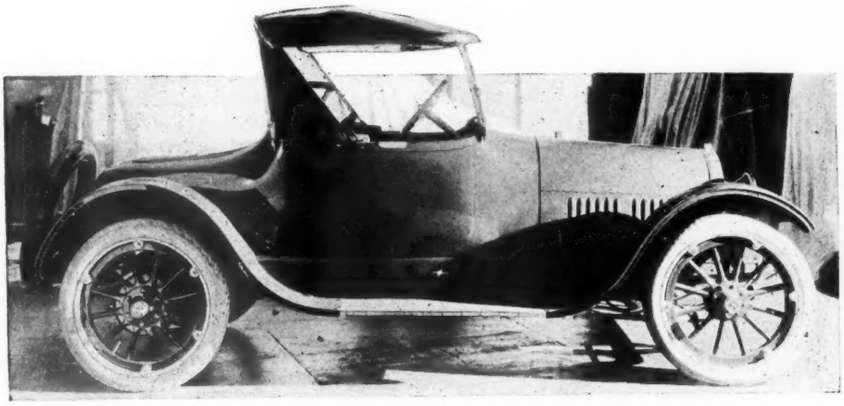
THE Moore Motor Vehicle Co. of Danville, Ill., has on exhibition a car on a 106-in. wheelbase, selling for $695. It is an assembled product with a Golden-Belknap & Swartz, four-cylinder, L-head engine, disk in oil clutch, Grant-Lees three-speed gearbox, Peru floating rear axle with Hotchkiss drive and 30 by 3½ tires. The car is furnished in either black or brewster green.

In equipment the Dyneto lighting and starting is furnished in connection with an 80-ampere Willard storage battery. Ignition is provided by Dixie magneto. The car is mounted on cantilever springs.

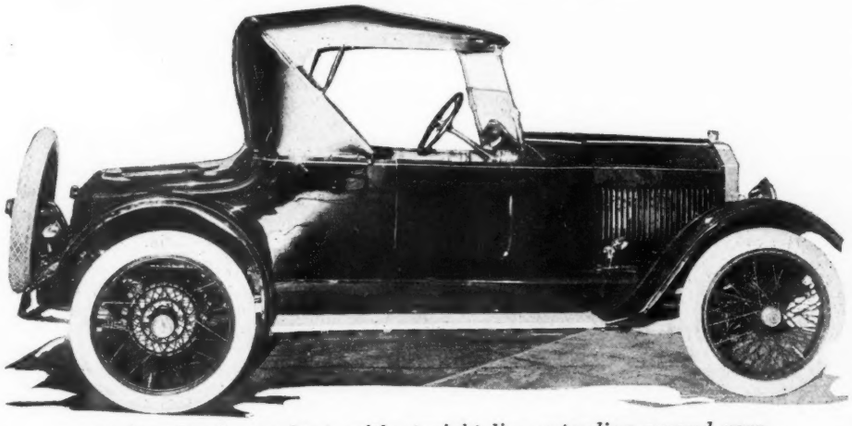
Stock Bodies Uniformly of Good Design

Angular Lines with Flat Sides and Sharp Corners Gracefully Handled—Beveled Edge Type Prominent

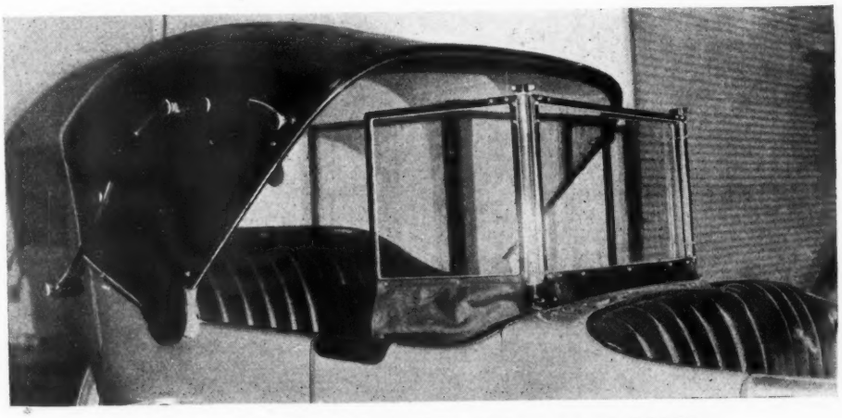
By George J. Mercer



Buick runabout, showing the gypsy quarter



Scripps-Booth runabout, with straight line extending around rear



Mercer, showing victoria top and tonneau windshield

THERE are some real new bodies at the show. These designs are the products of the last few months and represent the latest practice.

Innovations in design are not brought out solely to have something new, but are set in motion generally to meet a real need. Style is arbitrary and carries along until the sameness becomes irksome or is superseded for practical reasons. Not always does the change meet the requirements sought. It is brought into existence to remedy or meet a want, and with different minds working along the objective, different results are obtained until finally the blend of ideas will produce a permanent design that becomes standard.

The opportunity for change is greater in open bodies than in closed, and the runabouts are the most prolific breeders of innovations and consequently they are less standard than other types. These bodies are the most cheaply made and may be experimented with at less financial risk. This is amply borne out by show types, as the following studies will show.

What Drawings Indicate

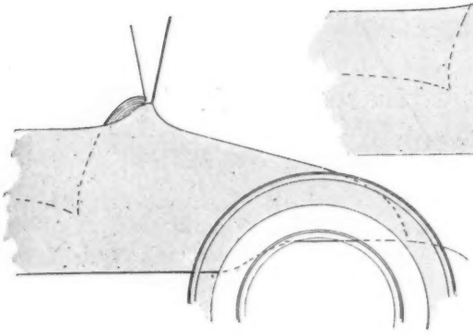
Figs. 9 and 6 are criticisms of details that mar the design out of proportion to their actual demerit. Fig. 9 is a case of having the radiator too narrow to blend with the body side line. Formerly the radiator was governed solely in size by the requirements of its cooling, but with the flush sided body the body lines converge at this point, and if the width is as narrow as the illustration the converging lines give the appearance of a pencil point, because the middle width of the body is established by the seat room.

Fig. 6 is another thing that destroys the good general appearance. The guard may be nearly right in every way, but if the space between wheel and guard at rear is more, proportionately, than at the front and top of wheel, it gives a distorted appearance. The guard should circle the wheel about as shown in Fig. 7. It is not absolutely necessary that the lower end curve the reverse as shown, but a guard with this shape certainly looks a better balanced one.

Of the runabouts at the show, the majority were those having a stern or hamper like the photographs of the Buick and others. Usually this hamper

Good and Bad Points of Body Design

Fig. 1



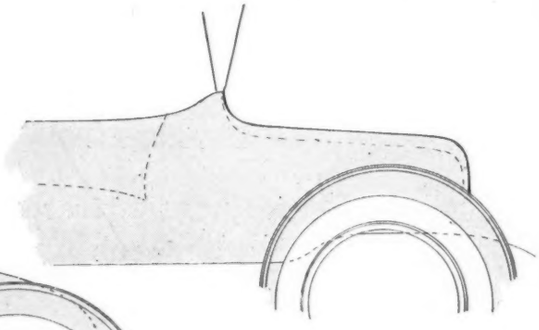


Fig. 2

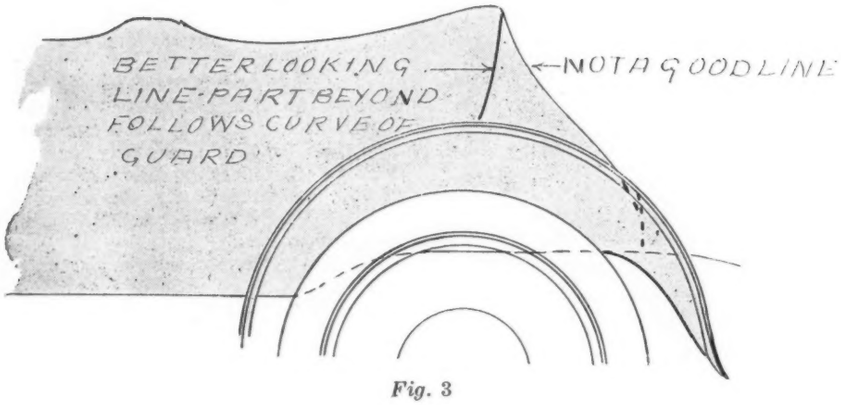


Fig. 3

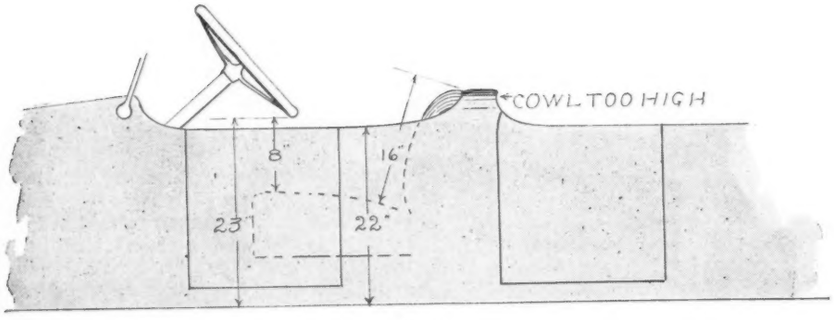


Fig. 4

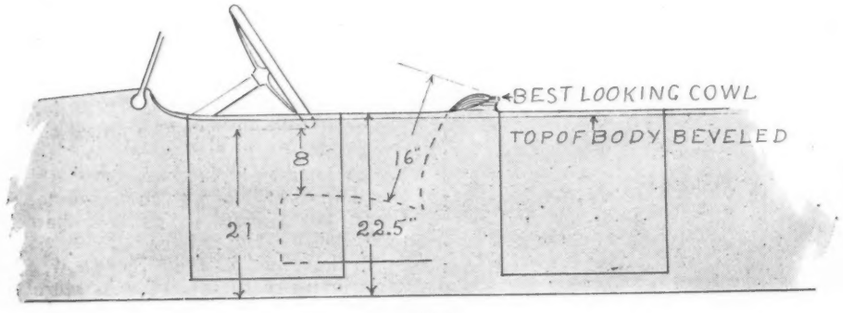


Fig. 5

contains a concealed seat. The making of a good-looking hamper has been a trouble to designers for years. Every possible shape has been tried, and the illustrations, Figs. 1 and 2, show the good and bad of it. The good is when the top deck is nearly horizontal, as in Fig. 2, while the shape as illustrated in Fig. 1 lacks definiteness as well as good lines. The great majority were of the better shape.

Fig. 3 is another illustration in which the good and poor lines are shown together. This hamper is shorter on account of being adapted from a clover leaf runabout. In this, as in the previous illustrations, the poor line is when same has an indefinite character.

Close-Coupled Body in Ascendency

In continuation of the clover leaf runabout, it was noticeable that there were less of these on exhibition than last year. At that time it looked as if this body type had made a permanent place for itself, but in the desire to make them compact, proper space to seat four people was never allowed. The result has been that the sport close-coupled touring body has begun to supersede it. This latter has the advantage of the four doors, it is better looking, the front seats are divided, and it has comfortable seats for four. But on some models the sides are too low and the manufacturers will cripple its coming popularity unless the body sides are high enough to come sensibly above the top of the cushion. Photographs of this body design show the Hudson and Cadillac. One of these shows the low and the other the moderately high side.

A good way to detect the proper height for the side is to compare on the side line the height of the cowl above the body side. If the disparity is excessive according to general practice, the seat cushion must be very close to the floor or the sides will not give adequate protection.

Essentials in Touring Bodies

In connection with the subject of the height of the sides of touring bodies, Figs. 4 and 5 will assist in answering the question that every car owner asks —why a certain recognized body looks better on one chassis than another. What we consider as essential in a touring body is low sides and an inconspicuous top to the driving seat. The second cowl, as shown on Fig. 4, is doomed. In its place has come the combination of the second cowl and the older seat back unified as shown on Fig. 5. To look well it should not come much above the side body line, and the dimensions given on these two illustrations show that in order to end right the starting point or position of the steering wheel is all powerful in getting results.

The second cowl, as shown on Fig. 5, is in most cases the continuation of the bevel edge of the body top. This bevel edge is rapidly superseding the rounded edge, as it gives a lower side appearance and a more distinct line of demarcation; also it makes it possible to continue the

side line straight through from the hood, when the latter is high enough to start. Several of the photos illustrate this.

Fig. 10 shows how the bevel edge should finish at the hood cowl. Along the body edge the width of the bevel is never less than 1½ in., but if this is continued around it looks too heavy; whereas if lightened, as illustrated, the appearance is wonderfully improved.

While the height of the driving seat back has been minimized to the extreme, the height of the rear seat is retained at 19 in. or over above the cushion top. This high back is always concealed when the top is down, and when it is up the gypsy quarter, which has become increasingly popular this season, will cover all above the body line, which is kept low or nearly horizontal to obtain the straight line through from the front to rear. Several of the photos illustrate these two points.

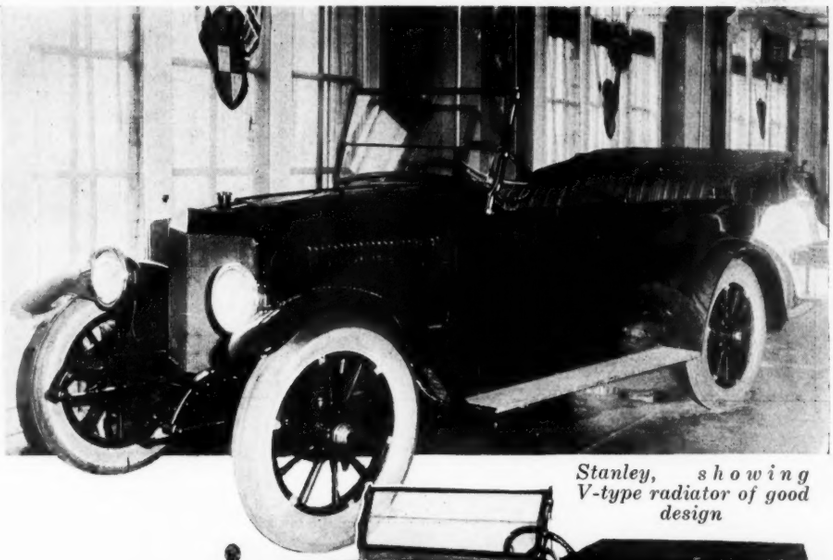
Use of Straight Lines

Fig. 8 illustrates how the straight line can be used even if the hood is slightly low. To continue straight back, this line has from all time been horizontal, but since the custom has obtained of raising the top line of the hood, the hinge line can be raised and still appear horizontal. In fact, on some cars where the frame sets lower than customary at the rear, this hood hinge line has the appearance of dropping toward the rear, and viewed from certain angles seems to carry the impression to the frame and gives the look of a sag at the dash.

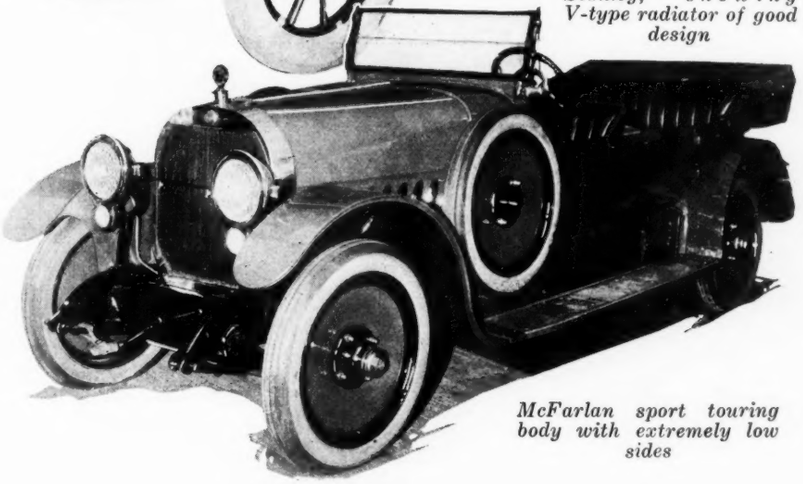
The closed bodies, while not so numerous as formerly, had a better or lighter appearance than at any other show. Figs. 11 and 12 are two illustrations which show how this is accomplished. Each illustration shows the belt molding and the roof. One, that on Fig. 11, shows the roof line straight and the side edges accentuated, the height of the crown being invisible beyond. The part that shows is blackened and the line of the roof center which is invisible from the ground is indicated by a single line. On Fig. 12 the roof is rounded to the center and the total thickness is always apparent. Rounded edges will on certain parts of the body give the impression of lightness, but on a roof it always adds thickness to the looks.

Belt Molding

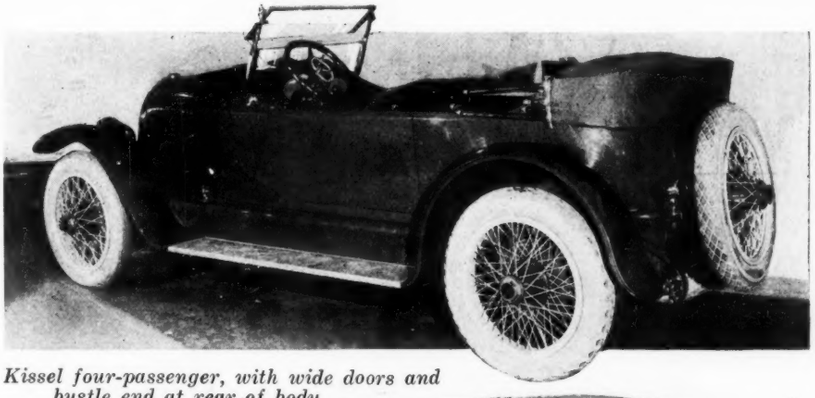
There is another point that is shown in the reverse relation on most of the bodies. The belt molding was shown as Fig. 11, but on a few they were as Fig. 12. The excessively heavy belt is only excusable when a makeshift proposition like a demountable top is put on a touring body. In this case, framing sufficient for the purpose must be added, and without a chance to conceal any of it. But with a properly built closed body there is no reason to show such heavy construction. It serves no useful purpose and detracts from the clean-cut look that might be otherwise obtained as shown in Fig. 11.



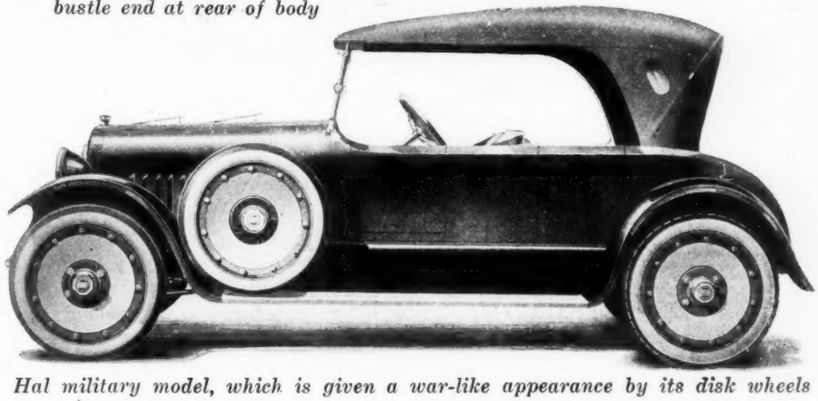
Stanley, showing V-type radiator of good design



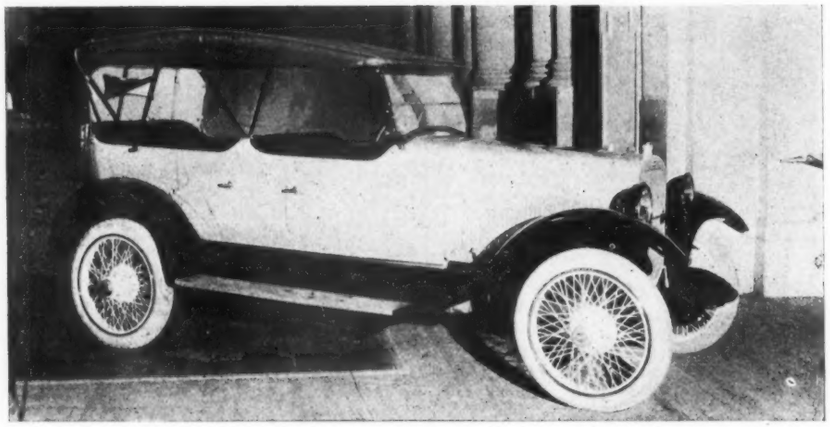
McFarlan sport touring body with extremely low sides



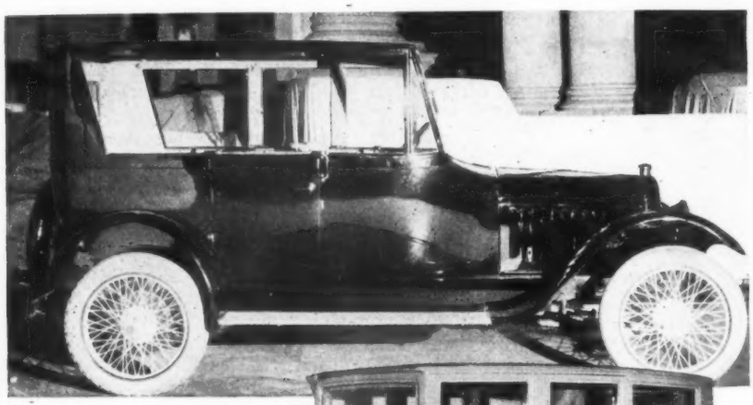
Kissel four-passenger, with wide doors and bustle end at rear of body



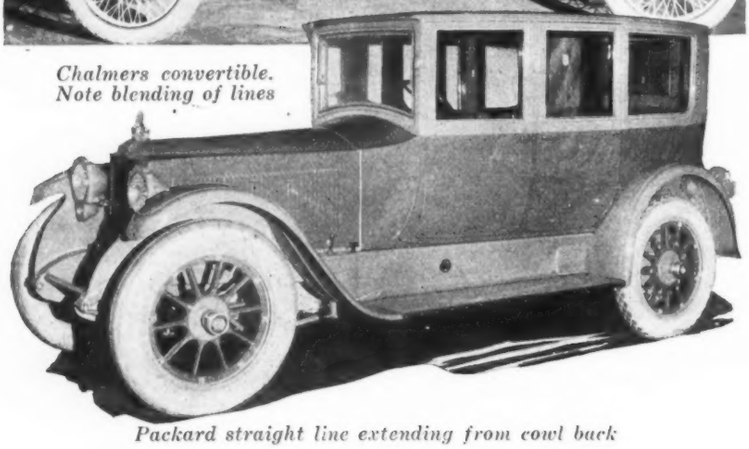
Hal military model, which is given a war-like appearance by its disk wheels



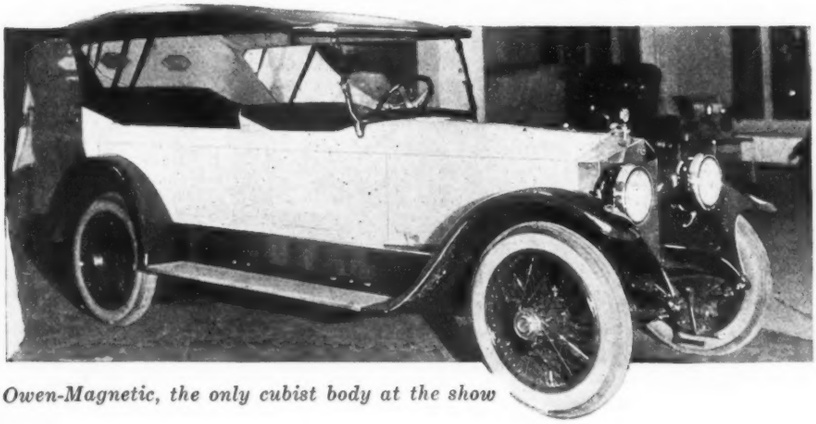
Chandler touring shows outside door handles and wire wheels and narrow long louvres



Chalmers convertible. Note blending of lines



Packard straight line extending from cowl back



Owen-Magnetic, the only cubist body at the show

There were more town car bodies than at any time in the past few years. They were of the brougham-limousine and cabriolet types, and some of the former had square rear corners. In fact, all the town car bodies had the regulation custom-built body appearance.

The windshield height on a town car body varies so much that Fig. 13 is introduced to make clear the needs requisite. The dimensions given are the height for headroom and for vision, and provided these are fairly well proportioned, the top curtain should come as far down as possible so as not to have a tall shield.

The various photographs illustrate as well as the sketches the points accentuated, and in addition some others, like the increased use of the Victoria top. One shows in conjunction with the top a tonneau shield. Good shaped guards are the rule, the moderate crown being the most common. Good guards make a lot toward the appearance of a car; especially is this noticeable when the front guard in addition to being well shaped is of generous length before attaching to the runningboard; also the slight outward curve at the bottom of the rear is an advantage.

The slanting windshield was the rule. There were few cowl lamps. Many of the touring bodies had a sensible bevel top body edge and a moderate height to the back of the driving seat. These bodies were of metal and showed good workmanship. The total absence of molding was another feature, and the doors had either the overlap panel or were flush, and there seems to be a reverse move toward the outside door handles. This is probably due to the trouble of locating the inside handle from the outside, as well as the objection that many have to the leather pad neces-

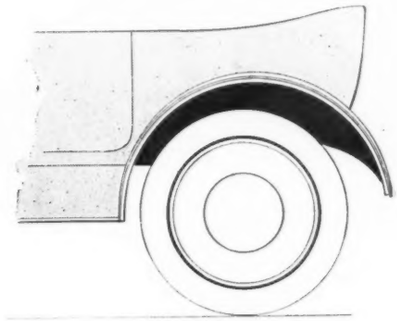


Fig. 6

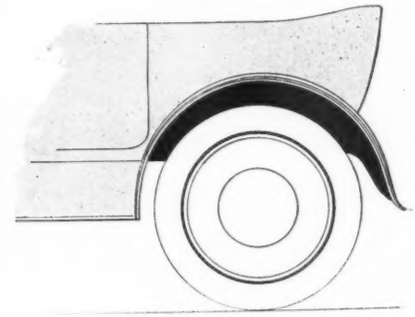


Fig. 7

sary for closing the door when there is no handle outside.

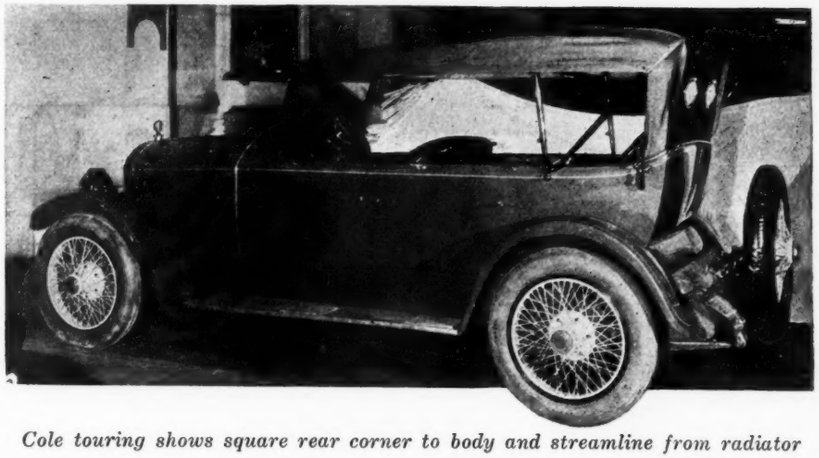
At the Astor salon there were bodies with the handle at the top of the door. Wheels or tires were placed with a very few exceptions at the rear of the car. This is good practice as it adds traction where needed. Both wire and disk wheels were common; wire wheels particularly were used with all the different kinds of bodies.

The trimming design on these touring and runabout bodies was almost exclusively the plain pleat. Leather was used principally. Some had imitation leather and a few had Spanish leather, while a few used a plush cord. The extra seats were of the floor flush type, and a lavish display of paint combinations was to be seen. Some were not good by reason of the shade or the combinations. The blue that looked almost green in the electric light was a good color, especially when relieved with white or yellow wire wheels. The bronze green, with red wheels, was good, as were many of the grays, coffee color and brown and yellow. Many of the light shades looked sickly because of the combination. The stripe line around the body below the top was a failure in most all cases. A double yellow line on a green body and a red line on a bronze green were the best illustrations. Some had the line too heavy, and altogether it seems that the putting on of this stripe is a delicate task.

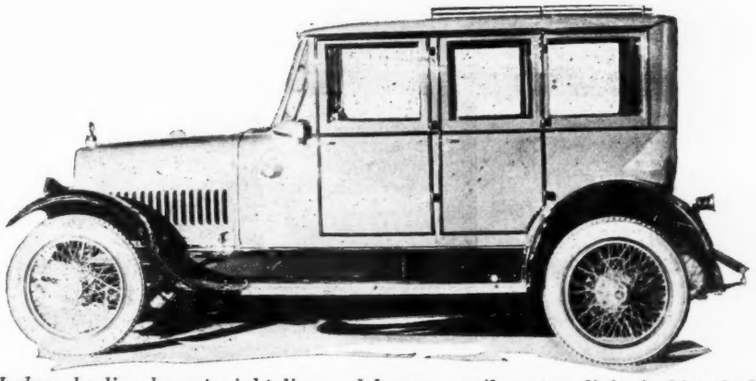
The closed bodies were equal with the open in presenting color schemes, with this advantage, that the combinations were more uniformly successful. There were the usual number of black bodies, but colors were plentifully sprinkled about. The trimming design on closed bodies was generally the plain pleat. Some had the plain design, and there were others that had the plain effect divided. The material was more somber in design than formerly. The medium light cloths were most popular. These were used without marking for the body of the job and the headlining and a striped design for the seat and back.

In some cases the plain cloth was used throughout, and also the figured material was used for the lower part up to the waist line.

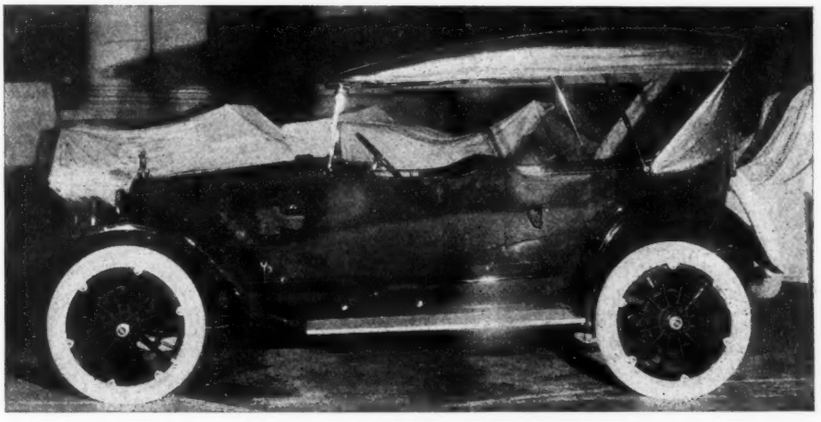
The appointments were gun metal or gold or dull silver. The toilet cases were elaborate in design. There was a



Cole touring shows square rear corner to body and streamline from radiator



Hudson berline has straight line and luggage rail on top, light looking body



Chevrolet shows tires at rear

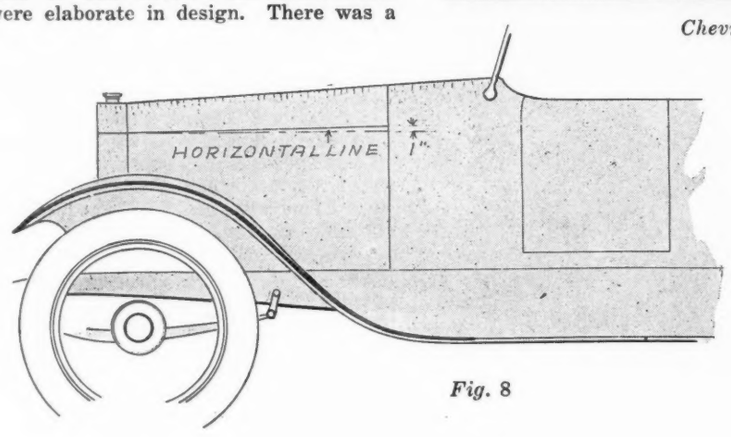


Fig. 8

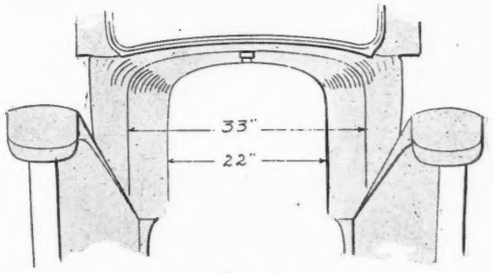


Fig. 9

Modern Body Lines Analyzed

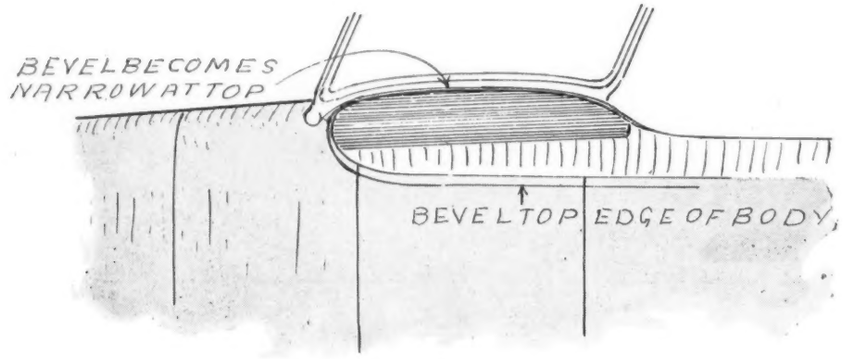


Fig. 10

Above—Fig. 11. *Below—Fig.* 12

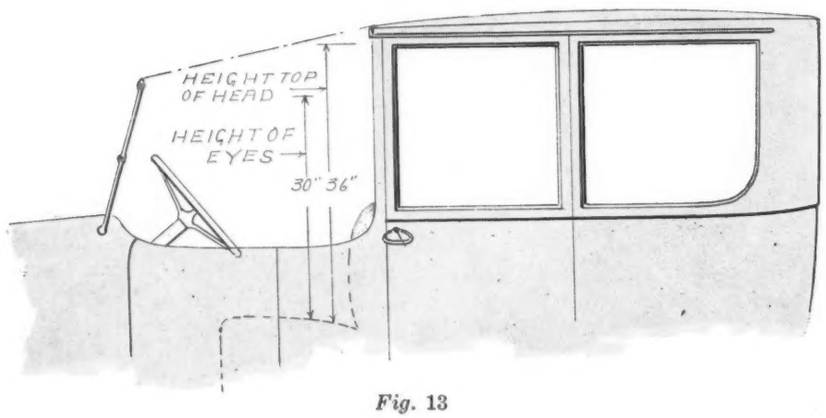


Fig. 13

total absence of interior inlaid woodwork, and there were several bodies without dome lights, the corner reading lamps set in flush but not concealed being the only light to be obtained. There were both the telephone and dictograph used and the pull-to handles were of good size, of metal and sensible for use.

As before stated, the closed bodies had a lighter look than in former years; there was a total absence of the large round roofed cumbersome bodies formerly so common. The berlines were of the divided sedan order. Sedans seem to be the popular body and the convertible with the flapper door were similar to those of last year.

Altogether the exhibit looked good because it was good. Designers of bodies that did not possess the merit that they should, had a splendid chance to see their mistakes, because there were good body designs of every type that were well worth using for models.

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Texas Has 194,740 Registered Vehicles

AUSTIN, TEX., Jan. 5—During the first five and one-half months, up to Jan. 1, 1918, that the State Highway Commission was in existence there were registered a total of 194,740 motor vehicles, including automobiles and motor trucks, and 3579 motorcycles. The number of dealers in the State is 3094. Licenses were issued to 12,696 chauffeurs, of whom about 25 per cent are in San Antonio. In the registration of motor vehicles there is no separation of automobiles and motor trucks. Included in the motor trucks are those owned and operated by the United States Army and other departments of the Federal Government, but no registration fee is charged for these. It is difficult to give anything like a reliable estimate of the total number of motor trucks in the State but there are probably ten thousand or more in operation. It is known that many automobiles and other motor vehicles have escaped the registration law. It is believed that if all were registered the total number would be close to 225,000. According to unofficial reports made by the county clerks of the different counties several months ago there were at that time more than 225,000 automobiles in Texas.

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Asks Cities to Eliminate Snow Troubles

WASHINGTON, Jan. 6—Because the severe snowstorms of the last two weeks have greatly affected the movement of war supplies and tied up city traffic to an alarming degree, the Highways Transport Committee is urging authorities in all cities to keep the streets on which freight is hauled as free as possible. This will facilitate the movement of products and relieve terminal congestion. Merchants and manufacturers in these sections have been asked to cooperate with city authorities by loaning men and wagons or motor trucks during such emergencies. It is also imperative that main arteries of highway travel between industrial centers be kept free of snow so as to permit traffic.

British Aviation Engine Inspection

Part I

1—Chart scheme of complete system in use

2—Best methods of employing women in work

3—Routine for rejection by government men

4—Plan of using approved firms is favored

5—Advantages of inspection to companies

By Lieut.-Col. R. K. Bagnall-Wild

EDITOR'S NOTE—*The British Government is reputed to have the most rigid inspection of any. Lieut.-Col. R. K. Bagnall-Wild, who has charge of the inspection of British aeronautical engines, is also president of the British Institution of Automobile Engineers for* 1918. *In his opening address to that body he analyzed the reasons for and methods employed in government inspection. While the system may be criticised, it is thorough and worthy of study.*

IN considering inspection we have first to ask the question, Why inspect? An inspecting staff is expensive and is usually classified as non-productive labor; therefore, it is obvious that the greatest possible care must be exercised in restraining those responsible for inspection from unduly inflating their staff beyond the minimum requirement.

It will, perhaps, help to realize why inspection is necessary if the various classes of men employed in production are compared. Omitting laborers, there are in average engineering works a majority of workers, both male and female, who, although graded as mechanics, are practically repetition workers. It is not necessary for them to have the training and the brain knowledge of the higher grade engineer. The further we progress with the introduction of automatic machines and a general system of repetition work, the more shall we be able to use less highly skilled labor. A certain proportion of the employees in an engineering firm must necessarily have skilled knowledge in tool setting, gauge making and the like, but they will not necessarily have general engineering knowledge. Even the more highly skilled men, who are employed as foremen over these various classes of labor, only require knowledge in their particular branch, from a production point of view. But from an educational point of view, all these grades, from the lowest to the highest, must naturally, if they wish to progress, obtain the knowledge necessary for promotion, and it is our duty to see that they do progress. This institution is in a position to grant unique facilities for improvement and advancement.

Start on Drawing

There is yet another branch which must be considered before the necessity for inspection can be clearly realized, and that is the design and drawing room. The engineer puts forward a design, the drawing room works it out in detail. Those drawings should be reproduced as shop drawings, showing the various processes for each part and clearly laying down the limits which are to be worked to and the material from which the parts are to be made. Starting with materials—it cannot be expected that the producer, *i.e.*, the mechanic, should have the knowledge required to determine whether that material is in accordance with the specification or not, and further, it is impossible for him, should the material be slightly above or below the limits of the specification, to determine whether it is safe to employ that material for the purpose for which it is intended.

The designer may justly be entitled to expect that a finished article is in accordance with his wishes, otherwise he could hardly be responsible for its correct functioning. Some department must, therefore, exist to take this responsibility, and an inspection branch for this purpose is essential. It is obvious that if incorrect material is allowed to go into the machine shop it will result in either scrap in the machine shop, or scrap when the finished article is put on test, or subsequent early failure. Undue scrapping in the machine shop upsets the steady flow of production—failure on test is excessively costly; the failure of one part may often lead to the scrapping of a considerable portion of the whole. For example, steel bar must be inspected to see that it is in accordance with the specification. Say it is nickel chrome steel bar, it might not be economical to machine it in its final hard heat-treated condition; it must, therefore, be received in the normalized state. Inspection alone will determine whether the heat treatment given for the finished article will produce the physical properties required by the designer. The bar must also be tested to show that when heat-treated the desired physical properties can be obtained.

Machine-Shop Inspection

Looking at inspection from the machine shop point of view, the workman desires output, because it gives him more money; the foreman desires output, for therein lies his chance of promotion; the production manager is obviously, if I may say so, the enemy of the designer, it is only human nature that this should be so. The directors and shareholders of a company must, therefore, protect themselves from bad workmanship, the reputation of the firm must be upheld and the finished article must be as good as is possible, having due regard to prime cost. Inspection alone will insure this. This need only be selective inspection in many cases, the main point being that a check must be kept on shop gages, tool setting (especially with automatics), etc., and any departure from drawings at once located, checked and nipped in the bud. If, for example, errors are allowed to creep in in the earlier processes, when there are ten or twelve operations, perhaps, in making one piece, it is quite clear that the cost and time of the remaining processes will be saved if the error

is checked in the earlier stages; consequently inspection is needed between each operation.

I could give a whole number of cases where I have found firms completing ten or twelve operations, and then having to scrap the part because the first operation was wrong, simply because the firm had no process of inspection of its own.

Spare Parts

Again, inspection of a finished part is absolutely essential prior to assembly of all the parts into the whole. A well-organized shop with a proper system of inspection results in a saving of time and money in erection. In many cases where the viewing of the output of the machine shop is slack, or is lacking, erection practically becomes "hand-fitting," interchangeability is entirely lost and spare parts impossible to fit. In other words, no two articles are alike. An organization, therefore, is required on the following lines: A small inspection staff to deal with all goods in the receiving or inward store (nothing being allowed to go into the machine shop unless bearing the stamp of that Inspection branch), and a complete system of process inspection in the machine shop and a view room between the machine shop and what may be called the erection or main store, so that nothing can go out of the main store to the erection shop unless it has been checked, stamped and certified as reasonably likely to be capable of being built into the whole without undue fitting and, also, to be able to correctly fulfil its functions.

Another small inspection staff is desirable in the despatch store to see that packing cases are adequate and correctly built to design, if any, and also to see that bright parts and so on are properly greased and every care taken that the goods are packed in such a manner as to be likely to arrive safely at their destination.

Turning now to the purchaser. The average purchaser is content to take a firm's name as a guarantee that the goods supplied are in accordance with the order. The purchaser usually protects himself by seeing that the articles are externally correct and function reasonably in accordance with his requirements.

Government departments go a great deal further than this. In the first place they are responsible for public funds and have to insure that value is obtained for money expended. In many cases the requirements may be of a special naval or military nature of which the contractor has little or no knowledge, and it is not to be expected that he can have other than a mere passing acquaintance with the working of a machine or parts under service conditions.

Inspection, from this point of view, may be divided into two main classes, namely, final inspection and detail process inspection. The former is possible in many cases, such as, for example, in the purchase of a lathe. Detail inspection is essential where the nature of the material is of vital importance in the functioning of the whole, as occurs where the factor of safety is low.

Inspecting Material

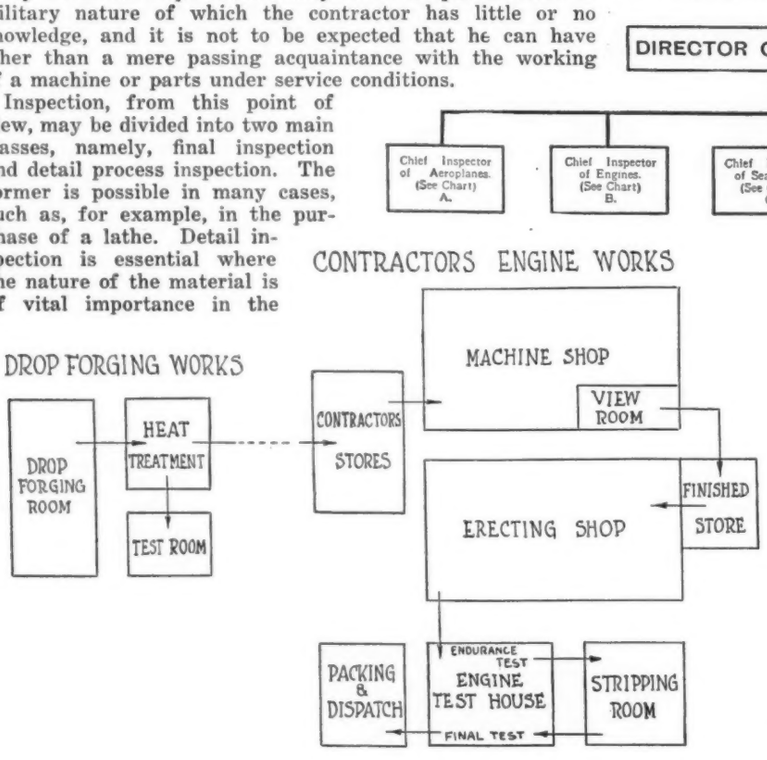
Detailed inspection during manufacture should not be necessary where a firm has a good view room of its own. In this case material must be inspected on or before entering the plant: steel should be inspected where it is made, namely, at the steelmakers' works or at the rolling mills. Any faulty material is then at once thrown out, or should be, and the steelmaker has an opportunity of tracing the trouble to its source. Freight to and from the steelmakers' and contractors' works is saved; in fact a double journey is obviated, as faulty material would probably be returned to the maker by the contractor. The inspector should exercise general supervision to insure that no parts are made from material which has not been so passed in the plant.

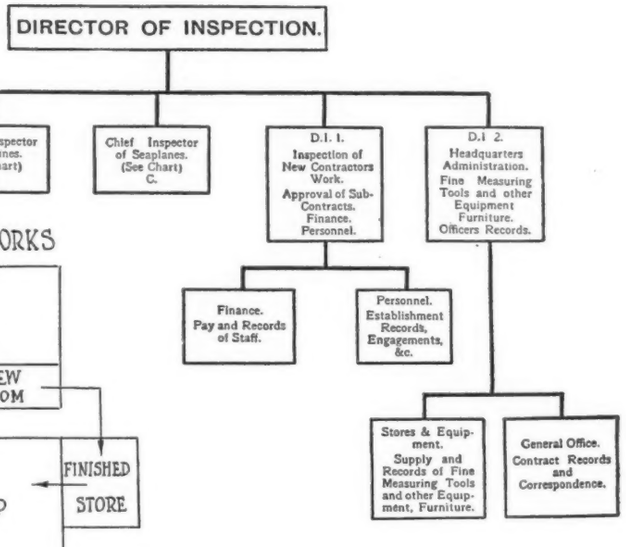
The next place where the inspection department picks up the thread is where parts have left the machine shop, and here again the amount of inspection necessary entirely depends upon the firm. As a typical example we may take the case of a good manufacturer who is, say, erecting 80 per cent of his products into finished machines and sending away the remaining 20 per cent as spares; it would probably only be necessary for the government inspector to inspect the spares, the machine itself being inspected after erection. If a running test is involved, this is carried out under the supervision of an inspector and careful examination is made upon conclusion to see that no parts are unduly worn or fail in their action.

Fig. 1 is a diagrammatic representation of an ideal inspection arrangement in connection with the production of crankshafts.

Departmental Co-operation

In considering the question as a whole, I must emphasize the necessity for a dovetailing of, and co-operation between, the various departments. In the first place the drawing room and inspection branch must come to a mutual agreement before the issue of drawings to the shops. Experience has shown that drawings as produced are very seldom clear or suited for commercial production. In some cases they even lack limits entirely and, where limits are included, there is a tendency in most drawing rooms to unduly tighten down




DIRECTOR OF INSPECTION.
Chief Inspector of Aeroplanes. (See Chart) A.
Chief Inspector of Engines. (See Chart) B.
Chief Inspector of Seaplanes. (See Chart) C.
D.I. 1. Inspection of New Contractors Work. Approval of Sub-Contracts. Finance. Personnel.
D.I 2. Headquarters Administration. Fine Measuring Tools and other Equipment Furniture. Officers Records.
Finance. Pay and Records of Staff.
Personnel. Establishment Records, Engagements, &c.
Stores & Equipment. Supply and Records of Fine Measuring Tools and other Equipment, Furniture.
General Office. Contract Records and Correspondence.

LEFT—*Fig.* 1. ABOVE—*Fig.* 2

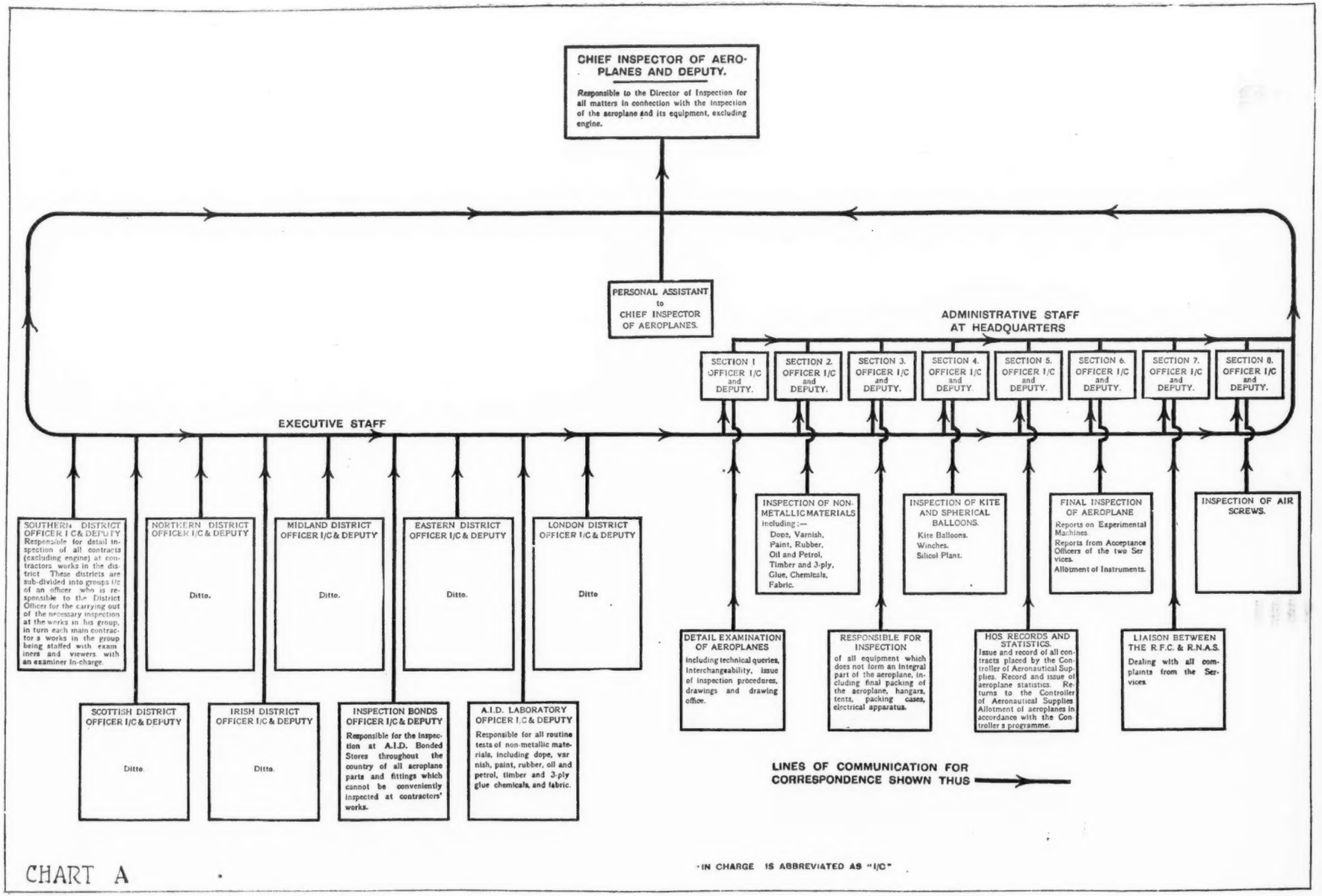

CHIEF INSPECTOR OF AEROPLANES AND DEPUTY.
Responsible to the Director of Inspection for all matters in connection with the inspection of the aeroplane and its equipment, excluding engine.
PERSONAL ASSISTANT to CHIEF INSPECTOR OF AEROPLANES.
ADMINISTRATIVE STAFF AT HEADQUARTERS
SECTION 1 OFFICER I/C and DEPUTY.
SECTION 2. OFFICER I/C and DEPUTY.
SECTION 3. OFFICER I/C and DEPUTY.
SECTION 4. OFFICER I/C and DEPUTY.
SECTION 5. OFFICER I/C and DEPUTY.
SECTION 6. OFFICER I/C and DEPUTY.
SECTION 7. OFFICER I/C and DEPUTY.
SECTION 8. OFFICER I/C and DEPUTY.
EXECUTIVE STAFF
SOUTHERN DISTRICT OFFICER I/C & DEPUTY
Responsible for detail inspection of all contracts (excluding engine) at contractors works in the district. These districts are sub-divided into groups I/c of an officer who is responsible to the District Officer for the carrying out of the necessary inspection at the works in his group, in turn each main contractor s works in the group being staffed with examiners and viewers with an examiner in-charge.
NORTHERN DISTRICT OFFICER I/C & DEPUTY
Ditto.
MIDLAND DISTRICT OFFICER I/C & DEPUTY
Ditto.
EASTERN DISTRICT OFFICER I/C & DEPUTY
Ditto.
LONDON DISTRICT OFFICER I/C & DEPUTY
Ditto
SCOTTISH DISTRICT OFFICER I/C & DEPUTY
Ditto.
IRISH DISTRICT OFFICER I/C & DEPUTY
Ditto.
INSPECTION BONDS OFFICER I/C & DEPUTY
Responsible for the inspection at A.I.D. Bonded Stores throughout the country of all aeroplane parts and fittings which cannot be conveniently inspected at contractors' works.
A.I.D. LABORATORY OFFICER I/C & DEPUTY
Responsible for all routine tests of non-metallic materials, including dope, varnish, paint, rubber, oil and petrol, timber and 3-ply glue chemicals, and fabric.
INSPECTION OF NON-METALLIC MATERIALS including :—
Dope, Varnish, Paint, Rubber, Oil and Petrol, Timber and 3-ply, Glue, Chemicals, Fabric.
INSPECTION OF KITE AND SPHERICAL BALLOONS.
Kite Balloons.
Winches.
Silicol Plant.
FINAL INSPECTION OF AEROPLANE
Reports on Experimental Machines.
Reports from Acceptance Officers of the two Services.
Allotment of Instruments.
INSPECTION OF AIR SCREWS.
DETAIL EXAMINATION OF AEROPLANES
Including technical queries, interchangeability, issue of inspection procedures, drawings and drawing office.
RESPONSIBLE FOR INSPECTION
of all equipment which does not form an integral part of the aeroplane, including final packing of the aeroplane, hangars, tents, packing cases, electrical apparatus.
HOS RECORDS AND STATISTICS.
Issue and record of all contracts placed by the Controller of Aeronautical Supplies. Record and issue of aeroplane statistics. Returns to the Controller of Aeronautical Supplies. Allotment of aeroplanes in accordance with the Controller s programme.
LIAISON BETWEEN THE R.F.C. & R.N.A.S.
Dealing with all complaints from the Services.
LINES OF COMMUNICATION FOR CORRESPONDENCE SHOWN THUS

CHART A

"IN CHARGE IS ABBREVIATED AS "I/C"

to an entirely unnecessary degree. Fine limits are required for interchangeability in some cases, but apart from erection considerations are not, as a rule, essential. For example, if two parts are to be bolted together it is, as often as not, quite unnecessary to make the bolts a push fit with something like half a thousandth limit on them. So long as there are two locating points, which may be either locating pins or push fit bolts, the remaining bolt holes may have even a thirty-second clearance on small diameter.

It is extraordinary how long it takes for drawings to reach their final form. The first 50 or 100 are completed, but modifications continue to flow in. It is only by close co-operation from the start that production can reach a proper basis at the earliest date.

Well-Organized Inspection Service Necessary

A great deal has been said about the discretionary powers of the inspector. Government inspectors, formerly, were well known as rigid adherents to drawings. They extracted the last pound without any reference to the effect on production and without using any common sense. This is true in some cases, where the inspector has the necessary knowledge, but not the initiative, to take the responsibility, probably from lack of encouragement. The most dangerous man, on the other hand, is the man who thinks he knows everything and takes too great a burden on his own shoulders. There must, necessarily, in a well organized inspection department, be a head with subordinates under him to control the action of inspectors, and it is but logical that first of all the men who actually visit the works should be given a certain amount of power, those controlling them should be given more and, finally, the head of the department should have full powers.

Fig. 2 and its accompanying charts A, B and C illustrate the organization of a well-known inspection department. It is divided into three main headings, and each of these is again sub-divided into sections, each section being given a different class of work. It is impossible to expect one man to know every branch of engineering; by sub-dividing in this manner it is possible to employ specialists in each particular branch.

I should like to touch on the possibility of employing women on inspection. I have had some very considerable experience of their work and I find they are quick to learn elementary details, *i.e.*, they can be taught to use micrometers intelligently, and naturally easily manage the "go" and "no go" gage. The woman with such a training cannot, however, be given discretionary powers to any extent.

The most economical way to employ women is to place an inspector with discretionary powers over a gang; all cases of doubt are put to him and the rejections carefully scrutinized by him, in order to ascertain why they are necessary. Where the amount of work is large and numbers of girls are employed the rejections should be gone over by a specially appointed inspector, as many of the parts rejected by the women viewers can be made use of for production purposes, either by alteration or by selective assembly.

With reference to women employed on, what may be called, routine work inspection, it is found that some show greater aptitude and greater intelligence than others, and these certainly make excellent inspectors. I can say, however, that with one or two exceptions, I have not yet found them to approach a man who has done his 5 years in the shops and been through a technical college training. It can hardly be expected that this should be otherwise, but it would not be surprising if at no very distant date we shall find women competing in engineering.

Handling Rejections

It is very necessary to arrange a proper system for dealing with rejections. When government inspection is in force I consider that the following procedure should be adopted:

The junior government inspector rejects. This is confirmed by a senior member of the staff, who then labels the part to show the cause of rejection, and he should also express an opinion as to whether the part could be returned to the shops for rectification. The part should then be passed back to maker's viewers, who, if they are in agreement with the government inspector, will take action accordingly; if they are not in agreement the part should then be put on what I term a "pending table" and a higher authority called in for consultation. In a large inspection organization this is arranged for by the appointment of district and traveling officers.

The main object in instituting such procedure is that the reason for rejections may be known at the earliest possible moment to the producer, so that the cause may be removed.

Occasional rejects are not, of course, nearly of such importance as, what I would like to term, bulk rejections. Tools or jigs may become worn and parts may start coming through outside the possible limits. In these cases the earliest possible action is obviously required, to avoid a hold-up.

I recently had an opportunity of studying the French government system of inspection, and it is interesting to note that it is almost exactly on similar lines to that adopted by me. It is not astonishing to note that the number of the inspection staff is in some cases rather less than that found necessary by me in England, as this is readily accounted for by the fact that labor is not diluted to anything like the extent it is in England.

The following brief résumé of the inspection system in this particular industry in France is, therefore, of interest:

The fundamental principles of inspection adopted by the French are almost identical with our own, but their method of applying these principles differs in many details.

The labor is almost entirely undiluted and of a very high average skill. At the works visited very few jigs and labor-saving devices were employed, the individual skill of the workmen being trusted to, with apparent success, as they do excellent work without nearly so much assistance as we give our labor in England.

Ease of production seems to have been most carefully considered by the designers. Details would appear to be designed, primarily, from a manufacturing point of view. It was particularly noticeable that the woodwork was often more elaborate than in English designs, while the metal work was cut down to the minimum.

The number of employees relative to the size of the works appeared to be much higher than in England.

Officer in Each Plant

An officer, with a certain number of subordinates, is stationed at the plant of each main contractor. It is his duty to see that only approved material is used and that each detail part, when finished, is viewed and stamped if approved. Components are again viewed, in many cases several times at various stages, to see that the workmanship is satisfactory and that approved details only have been used. Finally, the assembly of components into a complete machine is inspected at several stages, before the machine is passed, as we do in England.

Material is supplied by approved firms only, at most of whose plants there are resident inspectors, more particularly where high tensile steel or tubing is produced. The majority of the mild steel and practically all timber are inspected on arrival at the main contractors' plants. Finished details and accessories, where sub-contracted for, are supplied only by approved firms and inspected by either resident or visiting examiners.

The practice of returning to a sub-contractor any material which had not been approved before despatch to the main contractor is always strictly adhered to, except in cases of extreme urgency. Timber is usually inspected at the main contractor's plant, but frequently test pieces are taken and sent to headquarters for physical tests. These are, however, considered more in the light of educative information for the timber examiner than as a part of the acceptance procedure.

The process inspection of the various components and the final inspection of the machine appear to be excellent.

With regard to design it would appear that far less sub-contracting is done in France and, therefore, the question of parts made by a sub-contractor fitting a part made by a main contractor hardly arises, and a big saving in jigs and gages results.

The practice of employing only "approved" firms, each of whom has been proved to be capable of making certain parts

AERONAUTICAL INSPECTION DIRECTORATE.

ORGANIZATION OF ENGINE BRANCH.

CHIEF INSPECTOR OF ENGINES AND TWO INSPECTORS.

Responsible to Director of Inspection for the supervision and control of Inspection on Aeroplane Engines.

TECHNICAL AND ADMINISTRATIVE STAFF HEADQUARTERS.

ENGINE SECTION 1. O.I/C & DEPUTY.
TECHNICAL QUERIES ON ENGINES.

- Inspection.
- Defects, improvements.
- Ease of production.
- Manufacture, viz., drawings.
- Limits, gauges, Interchangeability.
- Material specifications.
- Methods of inspection, bench testing
- Maintenance and correction of drawings throughout Inspection Staff.

ENGINE SECTION 2. O.I/C & DEPUTY.
MATERIALS (METALS).

- Technical queries on material inspection.
- Defects, improvements, ease of production
- Manufacture from raw materials, viz. :— Forging, stamping, casting, swaging, &c.
- Methods of inspection, physical tests, analyses, micro-photography, and investigation of failures.
- Inspection of machine tools and electrical plant.
- Control of two inspection groups as a District Officer.

ENGINE SECTION 3. O.I/C & DEPUTY.
RECORDS, ALLOTMENT & CERTIFICATION

- Allotment of Engines, Engine output returns, and progress reports.
- Certification of issue vouchers and % payments for Engines on Test.
- Maintenance of Log-books and Engine Records.

ENGINE SECTION 4. O.I/C & DEPUTY.
LIAISON (MILITARY).

- Functioning of Engines in Aeroplanes.
- Liaison with R.F.C. Acceptance Branch and A.I.D. Districts to maintain efficiency.
- Technical queries on Engine Installations in Aeroplanes.
- Liaison with R.F.C. Testing Squadron and all R.F.C. units as required

ENGINE SECTION 5. O.I/C & DEPUTY.
LIAISON (NAVAL).

- Liaison duties similar to those of Engines Section 4 with R.N.A.S.
- Adviser to Chief Inspector on previous procedure.
- Administrative questions concerning attached Naval Staff.
- Responsible executive officer for an inspection group and a main contractor on similar lines to a district officer

ENGINE SECTION 6. O.I/C & DEPUTY.
PERSONNEL.

- All questions relating to appointments, rates of pay, increases, promotion, transfer, and release of Engine Branch Personnel.
- Administrative questions of a general nature affecting the Branch.

EXECUTIVE STAFF — DISTRICTS.

DISTRICT 1	DISTRICT 2	DISTRICT 3	DISTRICT 4	DISTRICT 5	DISTRICT 6

OFFICER-IN-CHARGE AND DEPUTY FOR EACH DISTRICT.

Responsible for inspection of all Aeronautical Supplies Contracts for Engines and Materials (Metals) at contractors and sub-contractors in the District.
Inspection is divided into two heads, Resident and Visiting.
A resident staff is maintained at the large main contractors; visiting staff or "floaters" being responsible for the inspection at smaller contractors and sub-contractors.

CHART B

correctly before being placed on the "approved" list, and can therefore be trusted to repeat correctly such parts, would seem to have had most excellent results and to be worthy of early adoption to a much greater degree in this country. I cannot emphasize that too strongly.

It is obvious that to obtain increased output we must develop and expand the works of existing contractors. The conditions in this country will, therefore, approximate more and more closely to the conditions in France, in that we shall have to rely upon the contractor for detail examination and concentrate our examiners on process inspection of components and on assembly. It is, therefore, urged that this expansion of the main contractors be very closely coupled with a strict control of the sub-contractor. The sub-contractors who have successfully turned out certain details with a low percentage of rejections should concentrate on these details and be expanded as necessary, new firms only being approved when all other sources of supply fail, and firms with large percentage of rejections removed altogether from the list. It is thought that much more might be done in this country to educate firms who waste material by their high percentage of scrap, for instance, 60 to 70 per cent of rejects on such things as nuts, or failing that to shut them down and make greater use elsewhere of the labor thus released.

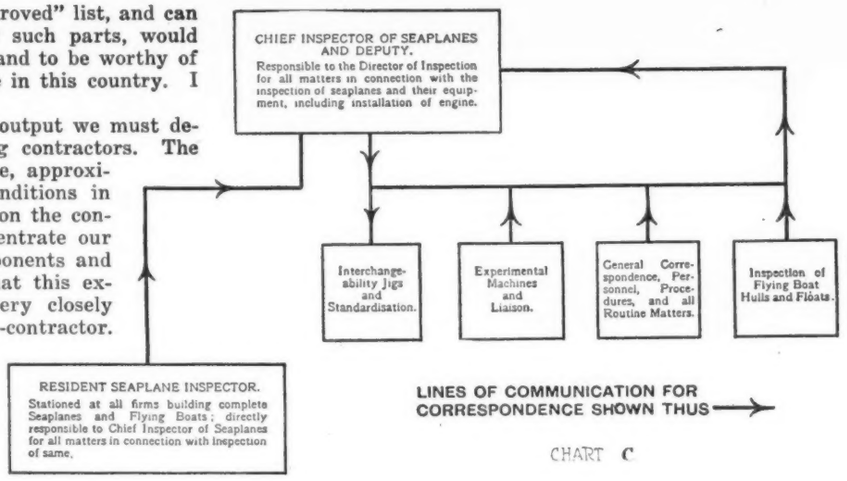

CHIEF INSPECTOR OF SEAPLANES AND DEPUTY.
Responsible to the Director of Inspection for all matters in connection with the inspection of seaplanes and their equipment, including installation of engine.
Interchangeability Jigs and Standardisation.
Experimental Machines and Liaison.
General Correspondence, Personnel, Procedures, and all Routine Matters.
Inspection of Flying Boat Hulls and Floats.
RESIDENT SEAPLANE INSPECTOR.
Stationed at all firms building complete Seaplanes and Flying Boats; directly responsible to Chief Inspector of Seaplanes for all matters in connection with inspection of same.
LINES OF COMMUNICATION FOR CORRESPONDENCE SHOWN THUS

CHART C

Inspection is essential to obtain efficient output. It is the only method whereby the directors of a company can ascertain the quality of the firm's output; it is their only safeguard that money, time and material are not being wasted in the production of scrap; it is a check on their purchasing department; it is a check on their design and drawing office, and it is even a check on their chief engineer, to whom the inspection branch is responsible. Facts will always speak, and the inspection department can at any moment produce figures showing rejections at any stage from the purchased raw material to the completed and finished article.

I do not consider that nearly enough attention has been given by managing directors and managers to the valuable data available in the inspection department.

It has been suggested to me that a full government system of inspection is but a duplication of work. For a long time I have had available a record showing rejections by the firms and rejections by me. These figures, of course, also give the percentage rejections on the total output, and they must, surely, be of vital importance, not only from the output point of view, but financially. A little more money spent on inspection, not only increases dividends, but brings in more orders. The better the article, having due regard to cost, the greater its popularity with the purchaser.

In talking of selective inspection it must be remembered that if we assume 10 per cent as a fair figure for rejections on a certain class of article, if the firm's view-room is adequate, some 9 per cent of that total of 10 per cent should be rejected by the firm, and something like 1 per cent—less preferably—should be rejected by the government inspector. In that case selective inspection may be safe. But many firms have asked to apply selective inspection where they are getting some 20 per cent scrap and where nearly 19 per cent of that is rejected by me and not by the firm. The whole object I have before me is to encourage the firm's view-room, but very often because they know a government inspector is going through everything, they do not care. They think they have no interest in the job at all, and therefore it is up to us to encourage the firm's view-room to have an interest in the work. I think the best way is to adopt selective inspection purely on facts, *i.e.*, according to the percentage rejected by the firm compared with that rejected by the government inspector, and in that way a good view-room will result.

The inspector, as a rule, is nobody's friend. This is not always his fault, it is a fault of the whole system, he should be encouraged to be human. He must not be on unduly intimate social terms with the production staff, but he must be capable of dealing with them with tact and cordiality.

I am certain that if more attention were paid and more encouragement given to the class of man employed by firms for this purpose, much better results would be obtained.

So far as I, personally, am concerned, I invite criticism and co-operation and am at all times willing to listen to suggestions which will further output.

[*Part II to be published next week*]

Ideal Road Illumination

DISCUSSING the automobile headlighting problem in *Electrical Review*, Evan J. Edwards, manager of the engineering department of the National Lamp Works, has the following to say regarding an ideal system: "The machine must be equipped so that in passing other machines it is capable of giving good road illumination up to 75 ft. ahead of the car and of a width sufficient to cover the roadway, say 15 or 20 ft. The light from the upward angles should be reduced to the absolute practicable limit. The upper limit of the high-intensity beam should be depressed about two degrees below the horizontal as a factor of safety to insure no-glare under practically all conditions of road curvature and loading of the machine. It would give good road illumination nearby which is essential to safety in passing. It would eliminate glare by the elimination of the light in the angles where might be found the eyes of the approaching driver. There can hardly be a question that such a system would be satisfactory insofar as the passing of other vehicles is concerned.

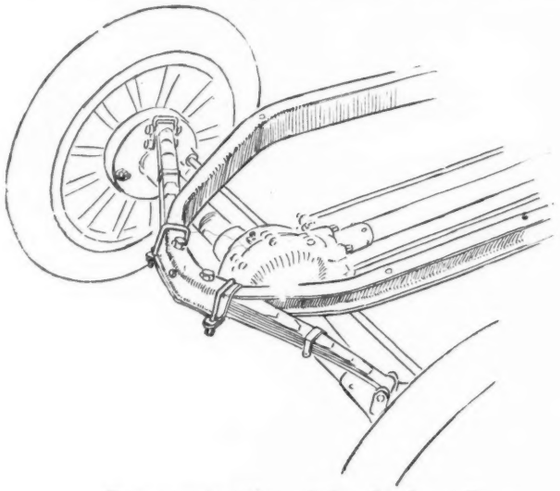
"Such a system, however, if fixed in position and the only one to be provided, would be very unsatisfactory from certain other standpoints. It would not have sufficient throw to permit of speeds that are often desirable. It would not give warning at a distance to the approaching driver on a cross-road. It would not give pedestrians warning of the approach of the vehicle. It would not give the sense of security and pleasure in night driving that is obtained by the illumination of distant objects in the upward angles. It would not allow a satisfactory range of vision when approaching the foot of a hill. All of these disadvantages are important and some of them are materially concerned in the question of safety. All of them are disadvantages common to all systems where the upward light is reduced or eliminated, and are serious to a degree inversely in proportion to their effectiveness from the standpoint of elimination of glare. None of these disadvantages appear in the standard paraboloid headlights; therefore, it would seem that the ideal system would be one capable of more than one kind of distribution. The points involved are of sufficient importance to bring the conclusion that a satisfactory automobile headlighting system for both country and city driving can never be obtained with one fixed distribution of the light."

Mechanical Features Revealed by the Show

(*Continued from page* 109)

a lower cost than other cars giving similar service. The Overland company has been producing small, low-priced cars for years, but the present model is avowedly an attempt to beat its best previous achievements and to create a machine for which there will be an enormous market.

The feature which strikes one most upon an inspection of the chassis is the running gear construction.



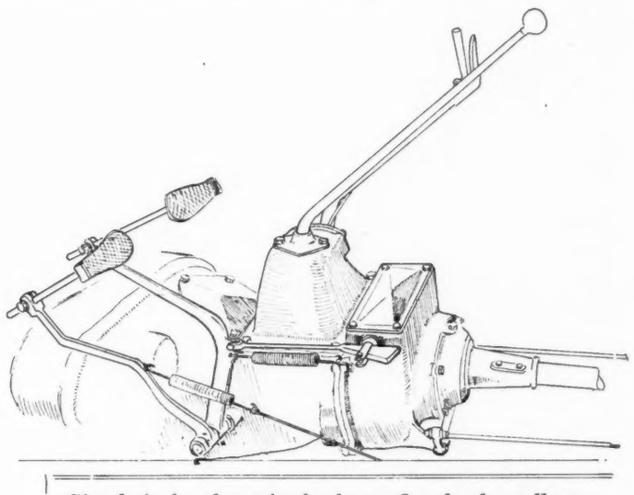
Rear construction of Overland small car

The frame is made of channel steel, with the open side of the channel turned to the outside. The frame members are joined at the ends in such a way as to give a tapering front and rear. This frame is supported on the axles by four quarter-elliptic springs extending underneath the tapering portions. By thus inclining the springs it is possible to have them act as thrust members or radius rods and at the same time bring the load close to the wheels so that the load on the axles is greatly reduced. The front springs are entirely in front of the axle and the latter is pulled by them.

Has Standard Type Engine

It has already been stated in these columns that the four-cylinder engine has 3 x 4-in. cylinders. It is of what has come to be regarded the standard type of engine for low-priced cars, with the cylinders and crankcase in one casting, the cylinder heads a separate casting and the oil base a pressing. Four-point support is used, there being four feet on the power unit which rest upon comparatively long brackets secured to the frame. An interesting feature is the service brake which is inclosed with the transmission. It is operated by means of a wedge which passes through a slot in a bar, operating against a roller in same. This wedge and its pull rod are in a single piece of the outline of a rifle, which connects directly to the brake pedal. Such simplification of the control linkage is especially valuable in a low-priced car where not much work can be spent on the joints and where a large number of joints is sure to result in noisy operation at an early stage in the car's life.

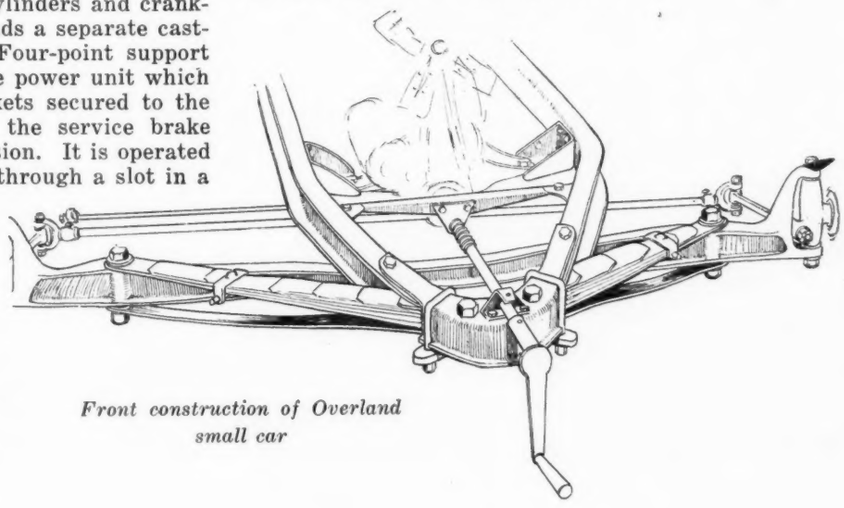
In the higher-priced class engineering considerations must sometimes give way to whims of the buying public or to their idea of the fitness of things. Thus we understand that the Packard control box on the steering post had to be discarded because the buying public did not fancy its appearance. From an operating standpoint it seemed to be a thoroughly sound construction in that it brought all of the controls in a very convenient position for the operator. From an artistic standpoint it was certainly not a very happy conception and inasmuch as most of this class of cars are driven by chauffeurs, attractive appearance makes more of an impression with the people who control the purchase than does operating convenience with which they have little or no concern.



Simple inclosed service brake on Overland small car

Thermostatic Temperature Regulation Increases

Temperature regulation, chiefly automatic by means of thermostats, is becoming a more important factor. The most usual arrangement is to have the thermostat control a by-pass on the cooling water circuit, but in some instances it acts on shutters on the radiator. In fact, heat control is one of the livest subjects in automobile engineering at the present time, and the future is sure to bring further developments.



Front construction of Overland small car

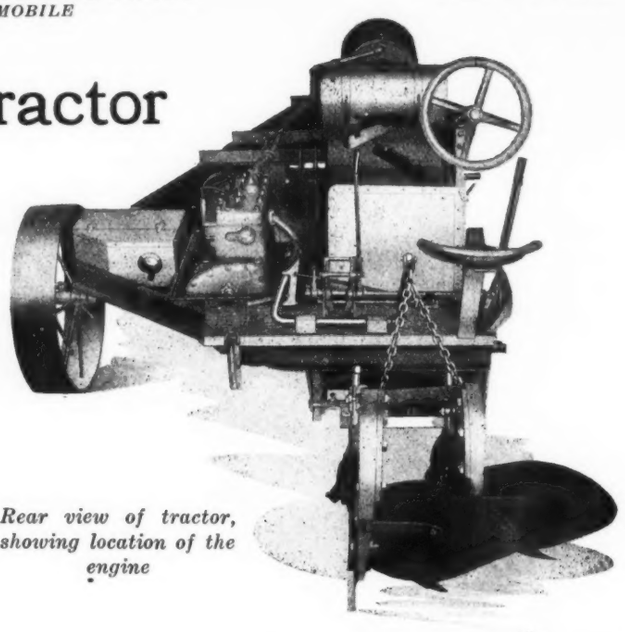
The Hoosier Farm Tractor

A Boiler-Plate Drum With Driving Lugs Serves as Drive Wheel—Also Has Two Non-Driving Wheels

A SMALL tractor suitable for farms of from 100 to 300 acres is manufactured by the Leo Rumely Tractor Co., La Porte, Ind. It is an assembled proposition and at present is built on a small scale only.

The engine is a Waukesha tractor engine and sets on the frame directly over the driving axle, next to the single drum type driving wheel. The tractor is of the three-wheeled type, having a single driving wheel at the rear, a swiveled steering wheel at the front and a guide wheel at the side. The engine is of 3¾ in. bore and 5¼ in. stroke and is rated by the manufacturers at 28 hp., but the Rumely company's rating of the tractor is only 18 hp. at the belt and 8 hp. at the draw bar. The engine is of the regular Waukesha type as built for truck and tractor work, and it is not necessary to go into a detailed description of it here. It is provided with a centrifugal governor which maintains its speed within well defined limits. A Kingston carbureter is fitted and is provided with a Bennett air cleaner so that the engine is protected from dust and grit. Ignition is effected by an Eisemann high-tension magneto of the waterproof type. Batteries are not needed for starting. No attempt is made to use kerosene, as the fuel consumption is comparatively low and it is figured that there will be less trouble with the engine with gasoline. For cooling the engine a large tubular radiator is provided and carried at the front of the tractor frame. This has a capacity of 26 gal. and has an 18 in., high speed, ball bearing fan mounted back of it.

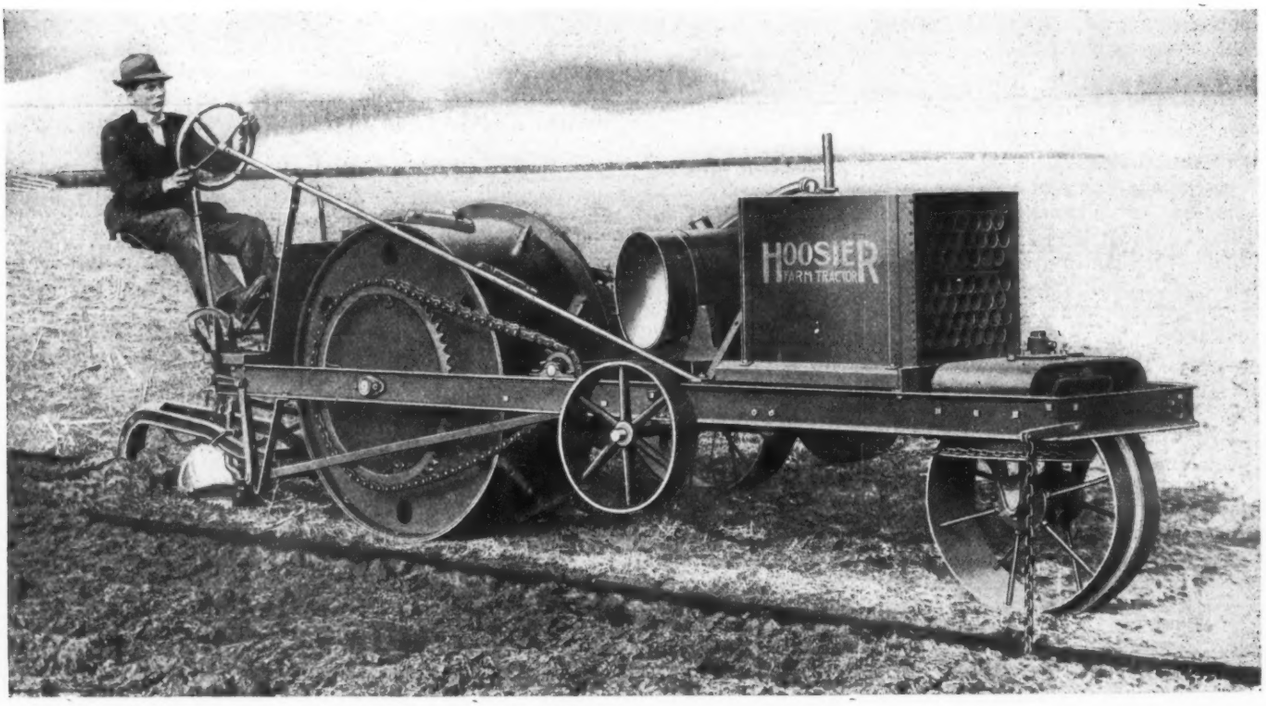
The power is transmitted from the engine through a Borg & Beck dry disk clutch, inclosed in the engine flywheel. The transmission affords only one forward speed and one reverse, the maximum speed being 2½ m.p.h., and this can be cut down by means of a throttle to 1¾ m.p.h. The gears are made of chrome nickel steel, have cut teeth, are hardened and run in a bath of oil. They are inclosed in a cast iron case. The transmission gears are mounted on double row ball bearings and the case is provided with a cover plate which gives ready access to the gears. The final drive from the transmission to the driving wheel is by a 1¾ in. roller chain which runs over hardened, cut steel sprockets. The driving wheel is 54 in. in diameter and has a 24 in. face. It is provided with detachable driving lugs. The axle is mounted in roller bearings 9 in. long. Of the two non-driving wheels the front one has a diameter of 30 in. and a 10 in. face and the one on the side a diameter of 40 in. and an 8 in. face.



Rear view of tractor, showing location of the engine

All of the wheels of the Hoosier tractor run on firm ground when the machine is used for plowing, none of them running in the furrow.

The draft on this tractor is unusual. The draw bars are hinged to the frame quite a distance in front of the rear axle



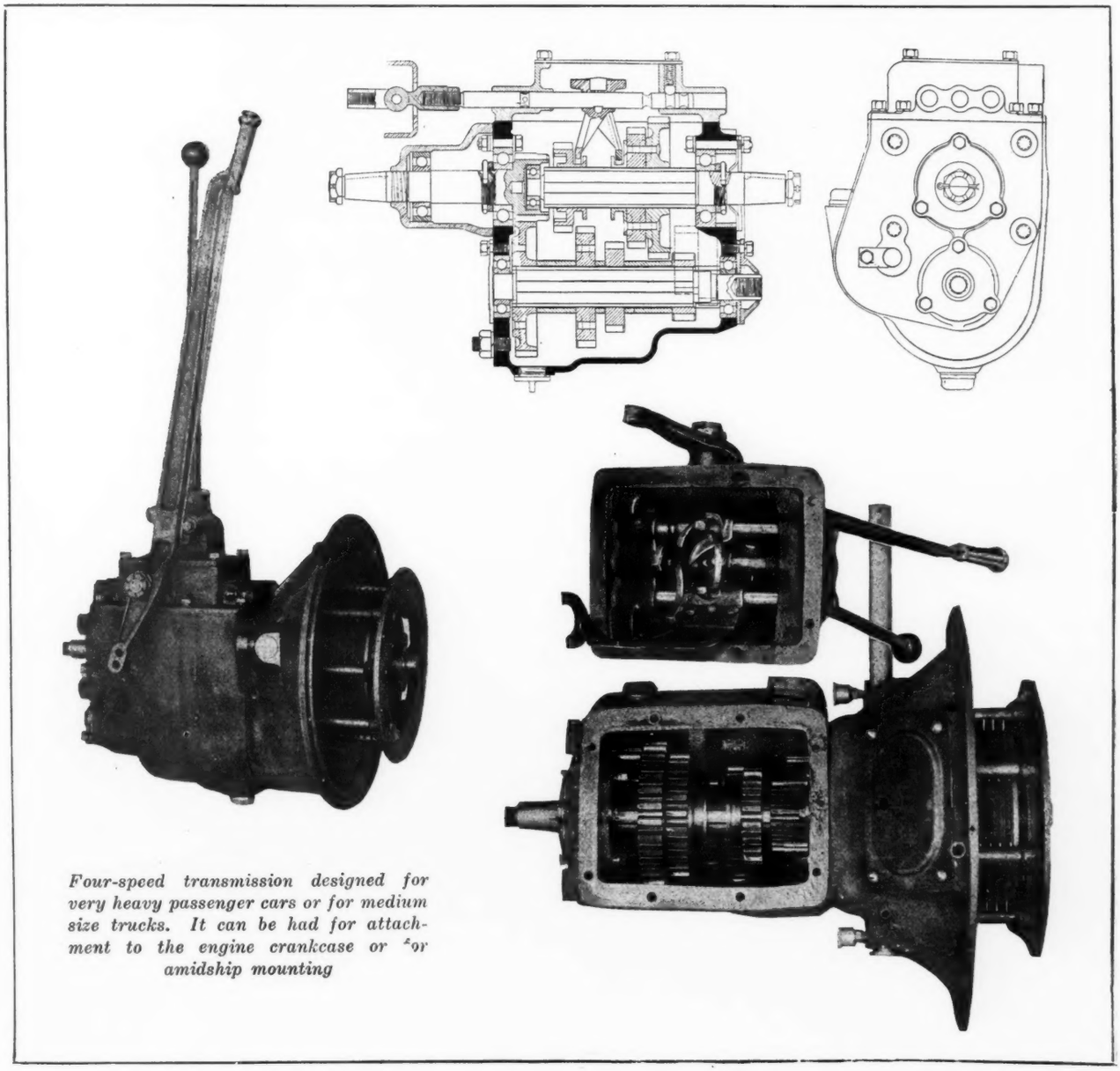
Hoosier tractor hauling two-bottom Grand Detour plow

and are inclined downward. By means of a lever convenient to the driver the height of the rear end of the draw bar can be adjusted within wide limits. In this way it is possible to adjust the depth of plowing from the driver's seat on the tractor. A special Grand Detour plow is used with this tractor, the plow beam being hitched directly to the draw bar. A plow lifting device of new design has recently been worked out, which is not shown in the illustrations. It is a power-operated device, a chain from the driving mechanism running over a chain pulley close to the driver's foot. Adjacent to this pulley there is a pawl and ratchet mechanism, the pawls of which are ordinarily held out of engagement by means of a trip. By operating this trip the driver can engage the pawls and cause the plows to be lifted out of the ground by means of power from the motor. This device makes it possible to make short turns and the plow may be backed into fence corners.

In addition to plowing, the Hoosier tractor is adapted for all sorts of belt work. It is fitted with a 20 in. pulley having an 8 in. face, and the pulley is located conveniently at the side so that the belt can be easily slipped on and off. The frame of the tractor is made of 5 in. channel steel. The weight of the whole tractor is 3900 lb.

New Fuller Gearset

THE great majority of passenger cars and practically all of the smaller trucks are fitted with three-speed gearsets, but there is a certain demand for four-speed transmissions for heavy trucks and passenger vehicles. To meet this demand Fuller & Sons Mfg. Co., Kalamazoo, Mich., have developed the transmission illustrated herewith. It is of the selective type, mounted on ball bearings throughout and has splined primary and secondary shafts. Gear and brake levers may be mounted directly on the cover plate, as shown in some of the illustrations, though if the chassis layout requires this, the gears may be shifted through pullrods, as also illustrated.



Four-speed transmission designed for very heavy passenger cars or for medium size trucks. It can be had for attachment to the engine crankcase or for amidship mounting

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The Automobile

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Engineering Progress in War Time

IF the history of automobile development since the beginning of regular manufacture were divided into a considerable number of equal periods and the advance in design made in each determined as nearly as possible, it would be found that the periods of greatest progress corresponded to those of low commercial activity. When market conditions are good; when the production of cars runs behind the demand, there is little incentive to make extensive changes in design, as these always occasion heavy outlay for new tool equipment and interfere with production. Besides, what is the use of making improvements when the cars already are so good that the buying public cannot get enough of them? But when trade slackens off and when purchasers no longer are glad to get any car in reasonable time but are most exacting in their demands the manufacturer feels the need of having his product up to date in every respect. There is the further consideration that improvements or new models can be introduced with much less trouble at a period of slackness than when a factory is working to its limit.

While the war lasts the demand for passenger cars will undoubtedly remain below normal and competition will be quite keen. It will be difficult to sell cars which do not conform to the requirements of the times. During the early stages of the war there has been a tendency to drift along, largely due to the unsettled conditions that obtained, but now that it is fairly plain what we are in for we may expect renewed activity in development work, as it will be every manufacturer's aim not only to fortify himself for the somewhat trying times immediately ahead but also to place himself in position to take full advantage of the boom that is sure to set in with the return of peace. New models and changes of a radical character should be given a long try-out before being put in regular production; therefore, makers should not delay shaping their plans. Although nobody can tell what the future holds and how far the end of hostilities is still off, in view of the fact that most British manufacturers already have their post-war models ready it is not too early for our own manufacturers to begin preparing for business under the somewhat changed conditions upon the return of peace.

Motor Plows vs. All-Purpose Tractors

HORSES on the farm are what might be called multiple purpose machines. They draw all of the different implements used for preparing the soil, seeding, cultivating and harvesting; they draw the wagons in which produce is carried to market and farm requisites home, and they operate various types of stationary machines through so-called horse powers. One of the fundamental problems of power farming is whether it is the best policy to design a machine that is capable of doing every kind of work that the horse usually does on the farm, or whether special machines should be developed, at least for the more important classes of work, such as plowing, road hauling, etc.

An all-purpose machine must naturally be a compromise and cannot be as efficient in any particular service as a machine specially designed for that service. In the manufacturing industries this is the age of the special machine. Large boring mills and drill presses, for instance, are designed to work on only one particular machine part, and the advantages of this method are so overwhelming that no one would think of using stock lathes and drill presses—the all-purpose machine tools—where many thousands of parts of the same kind are wanted.

However, in farming the conditions are entirely different from those in manufacturing. If plowing could be done from the beginning of the year to the end it would certainly be best to design machines to do nothing else. As a matter of fact the time occupied in plowing on the average farm is only 20 to 30 days per year. Therefore, a motor plow would be idle more than 90 per cent of the time. It is true enough that a piece of machinery when not in use does not require to be fed, as does a horse, yet it

occasions expense, because there is money invested in it and this money has interest-bearing power.

It is certainly a highly desirable thing to have machinery operate as efficiently as possible, but where expensive machinery is involved it is equally, and perhaps even more important, that it be kept at work as nearly continuously as possible. This phase of the subject may not have received much attention in farming because there seems to be little possibility of changing the rather rigid routine of the farm year. On the other hand, managers of electric central stations make every effort to "flatten out" their load curve, which means doing the greatest amount of business with the least equipment. The advantage is that the interest charge per unit of electric energy sold is reduced.

This same principle holds equally well with respect to farm machinery. It does not matter whether the farmer uses his own capital or borrows money for purchasing the implements, the capital tied up might bear interest, and if the equipment is not used the interest charge is a loss. The fact must also not be lost sight of that farm machinery during periods of nonuse frequently does not receive proper treatment and in consequence depreciates rapidly.

In view of the above facts there is every likelihood that the development of agricultural power machinery will be along the line of the all-purpose tractor, because a fair degree of efficiency can be obtained with such a machine in the different lines of work for which it is adapted and the farmer does not need to make heavy investments in a variety of machines for which he has no work the greater part of the year.

War Time and Shows

THE show is a success. True, there are not the choked aisles and the surging crowds of past years. There are not the groups of youthful catalog collectors nor the fancy dress parades. On the other hand, there is an intelligent attendance of potential buyers and business people. As a show of the products of a great industry the Palace is a veritable mart of trade for those within the industry itself. The manufacturer, the jobber and the dealer are naturally all there in large numbers and this year has witnessed no great cessation in their activity.

The public itself is amazed at the show. It has been fed on stories of what the war has done to the automobile industry and expected to see this year marked effects of the war upon the exhibition. Instead visitors see a show that is just as great as, if not greater than, any of its predecessors. Here are better products, more efficient vehicles to help in transporting busy Americans from place to place. The great essential of individual transportation, the automobile, is here more highly developed, more artistically dressed than ever before.

A noticeable fact is that the opening day had the least attendance. The throngs were conspicuous by their absence. Since that opening day the attendance is gradually building up and becoming larger. More business is being done and the prediction that the opening of the show season would witness a restoration of confidence is being borne out.

War time, instead of being a bad time to hold the show, is the real time in which its merit becomes evident. "Speed up the industries!" is the battle cry that will lead the nation to victory, and anything which has a stimulating influence will tend to speed them up.

Strong-hearted industries, capable of working at more than normal pace, capable of supplying first government needs and then their own without a letup in efficiency and capable of not only handling all the work of the war, but the work of peace besides, are the ones that are going to help most. The show is a stimulant and its success has proved its strength.

Demountable Wheels for Motorcycles

NOW that motorcycle wheels have been completely standardized, with the exception of the hubs, there is some chance of demountable wheels coming into use the same as on automobiles. It is hardly to be expected that a spare wheel will ever be carried on a motorcycle, as it could not be stored conveniently, but wherever motorcycles are used in considerable numbers and subjected to severe service, demountable wheels would simplify the repair problem. The advantages of demountable wheels would no doubt stand out most strongly in military service in which wheels fail frequently. Following automobile precedent, there would probably be two hubs, an outer hub forming a permanent part of the wire wheel and an inner hub containing the bearings and carrying the driving means. To this inner hub the outer hub would be secured. Only one type of outer hub would be used. The inner hubs would be different for front, rear and side car wheels, but each type of inner hub would have its outer contour designed to accommodate the standard design of outer hub. One of the most important problems in connection with such demountable wheels is that of the driving connection between the two hubs or between the chain wheel and the outer hub of the rear wheel. The parts must go readily together, yet there must be no slack in the connection.

The chief advantage in a demountable wheel for motorcycles in large services is that it obviates extensive loss of use of the machine due to failure of wheels. If a wheel breaks it is simply removed from the inner hub and another one is substituted, which is the work of a few minutes, whereupon the machine can be replaced in service. The old wheel can then be repaired if this is thought worth while, or else junked. Where ordinary wheels are used not only must three different sets of repair wheels be kept, but each wheel, since it contains the rather expensive bearing hub, ball bearings, etc., represents a greater investment than a demountable wheel. Nowhere is there such a need for demountable wheels as in war operations and the subject will undoubtedly receive full consideration in the design of the army motorcycle.

Standards Committee in Busy Session

Action Taken on an Unprecedented Number of Subjects — Aeronautic, Motorcycle, Roller Chain, Data Sheet, Miscellaneous and Tractor Divisions Get Reports Adopted — Lack of Quorum at a Late Hour Prevents Adoption of Marine and Tire and Rim Division Reports

ONE of the busiest sessions ever held by the S. A. E. Standards Committee was that at the New York headquarters on Wednesday. More than one half of the session was occupied by reading, discussing and voting on the voluminous report of the Aeronautical Division which contained no less than twenty-three proposed standards. The word standards, however, is not quite to the point in this connection.

It is realized that aircraft engineering is as yet in a state of rapid development and what may seem best to-day may be greatly improved upon within a year. Therefore it has been decided to refer to all of the completed work of the Aeronautic Division as "Recommended Practice" and not standards.

Upon the opening of the meeting by Standards Committee Chairman Utz, Standards Manager Hanks read his report. It reviewed the work done by the Standards Committee in co-operation with the Government, toward the development of the Liberty truck and in the standardization of certain features of motorcycles.

After a certain amount of work had been done along each of these lines the Government took complete charge and selected committees of designing engineers who continued the work of design at Washington.

Need for Speed Was Urgent

Taking up the subject of aeronautic standards Mr. Hanks said:

The aeronautic war standards were required to be turned over to the Government in the shortest possible time. It was not practical to ask the Government to wait 6 months for the S. A. E. to pass the standards through the usual routine. A short cut was authorized by the council, permitting results arrived at at any division meeting to be released immediately to the Government Bureaus needing the standard.

The Government representatives were always present at these meetings, so they were in the closest touch with all conditions from both engineering and manufacturing standpoints. On all these recommendations which went to the Government by short route, a notation was entered at the bottom of each, reading:

> This practice has been recommended by the Aeronautic Division of the S. A. E. in co-operation with representatives of the U. S. War Dept. (or other departments co-operating.)
>
> If, for any reason, your requirements cannot be brought into harmony with this practice, please notify promptly the Society of Automotive Engineers, 29 West Thirty-ninth Street, New York City, returning this sheet with comments thereon.
>
> This practice recommended represents the consensus of opinion of the advising engineers as of (date on which the recommendation was made).

In order that these recommendations might be of the greatest value and be available when wanted, they were printed or mimeographed on standard letter-size paper and placed in loose leaf binders with the S. A. E. emblem on the cover, and sent to those in charge of the various Government bureaus.

In much of the standardization work heretofore attempted, a careful review of American practice with American engineers was all that was necessary. This procedure did not fully meet the requirements in the aeronautic field, as our airplanes are going abroad and the experience of both the foreign builders and ourselves must be co-ordinated. The I. A. S. B., composed of engineering representatives from the United States, Canada, England, France and Italy has been the medium for this co-ordination, and many S. A. E. members are on this board.

The Aeronautic Division has held a total of 24 meetings during the year 1917, including sub-committee meetings. The largest number of meetings held by any Division in previous years was by the Engine and Transmission Division, who had 7 in 1916.

The amount of business transacted by the Standards Division is illustrated by their offering for your consideration to-day a list of some 65 recommendations. In 1916 a total of 38 standards were passed and 45 meetings held. In 1917 there were 109 meetings, and the total number of standards passed for final action was 122.

Aeronautic Division Report

First the report of the Aeronautic Division was taken up, C. M. Manly, chairman of this division, presenting it. In several sections of this report, references were made to government departments in the capacity of purchasers, and it was decided that it would be better to make the recommended practice of general application and to this end substitute the word "customer" for the Signal Corps or other department of the Government.

In the cellulose nitrate report the wording "according to the standard method of the Bureau of Ordnance" is to be replaced by "the Standard Government Method of the Abel Stability Test." The Signal Corps absolutely objects to the use of tetrachlorethane and an item was therefore inserted to the effect that dopes containing tetrachlorethane will not be acceptable. With these amendments the report was adopted.

Specifications Not Ideal But Practical

Dr. Smith of the Bureau of Standards said that the specifications were not ideal but they were practical. The Signal Corps was drawing up specifications for its own use which were being based on the report of the Division. It was hoped to incorporate in these specifications a test for durability, but the work in connection with this test had not yet been completed. Later on, it was the intention to also draw up specifications for a non-inflammable nitrate dope on which tests are now being made.

Dr. Percy Walker of the Bureau of Standards presented the report on spar varnish specifications. One objection was the great latitude allowed in the temperature range in drying the varnish for the bending test. It was decided by the subcommittee to limit the range to 21-24 deg. C. instead of from 21-32 deg. C. as originally proposed. It was stated that Mr. Hanks had sent out a circular to different varnish makers asking for criticism of the proposed change and that the comment made had on the whole been favorable. Mr. Walker, however, pointed out that there was no lack of criticism of the work of the sub-committee and that the hot water test proposed had met with particularly strong objections. Mr.

Costello, representing the Signal Corps, said that there was quite a possibility that they would omit the hot water test from their specifications. Grover Farnsworth, an aircraft engineer, on the other hand, agreed with Dr. Walker regarding the utility of this test. The report was adopted without further amendments.

Requirements of Good Glue

Presenting the report of the sub-committee on glue specifications, Mr. Manly said that he expected more opposition to this report than to any other. One change that was suggested and accepted without opposition was that wherever the term "the government" or the name of any department of the government appeared, it should be replaced by "the customer."

The report as presented specified that "the glue must be a high grade hide glue," but it was brought out that hide glue is at present practically unobtainable in this country. Glue is manufactured from hoofs, bones and other parts of the animal and it seemed to be the opinion among glue manufacturers that the part from which the glue is made is not such an important factor as the process of manufacture. To get around this it was suggested that the word "hide" be replaced by the word "animal".

Another point to which objection was raised, was the requirement that the strength test of the glue be made by means of two pieces of maple or birch having a shearing strength of at least 2400 lb. per square inch. It was pointed out that if the longitudinal shearing strength was meant, this seldom exceeds 1500 to 1600 lb. per square inch and that woods of this kind showing 2400 lb. shearing strength were absolutely unobtainable.

Mr. Manly said that there had been some discussion regarding this figure, which had been based on information furnished by the National Forest Products Laboratory. Another suggestion made was that the second illustration in the report, showing a double shear test block, be omitted. This suggestion came from Mr. Manly who said that he had had very poor results from test blocks of this kind, as the blocks would invariably spread and the glue not fail under shear but rather under tensile stress. It was finally decided to refer this report back to the committee with instructions to gather information as to what shearing strength could reasonably be specified for the test pieces of maple or birch.

Specifications for Steel Wire

In connection with the specifications of round high-strength steel wire, objection was raised to the torsion test. According to the specifications, a sample of the wire not less than 10 in. long and gripped by two vises 8 in. apart, must be capable of being twisted a number of times equal to the constant 2.7 divided by the wire diameter in inches. It was asserted that it was absolutely impossible to get large diameter wire which would meet with this requirement.

It was therefore agreed that the number of turns which the sample must be able to stand should be equal to a constant factor to be agreed upon between the customer and the manufacturer, to be divided by the wire diameter in inches. The adoption of this amendment also made it necessary to eliminate the third column in a table accompanying the report. With these changes the report was adopted.

Next the subject of non-flexible steel wire cable was taken up and quite a spirited discussion ensued regarding the best method of rust-proofing the wire. The report as presented required that the cable be uniformly coated with pure tin. Mr. Manly stated that the U. S. Government preferred galvanized cable and that his firm used such cable at the present time. The International Aircraft Standardization Board, on the other hand, favors tin covered cable. Mr. Erickson of the Canadian Aircraft Board, who represented the I. A. S. B. at the meeting, said that tinning the cable not only insures greater strength as compared with galvanizing, but also facilitates soldering. He stated that differences in strength of as great as 8 per cent in favor of the tin cable had been shown.

Mr. Manly said that he had been discussing the matter with Mr. Horn of the Roebling Steel & Wire Co. who favored the galvanized cable, while other makers seemed to favor the tin cable. The Roeblings were willing to make either kind, but were very anxious that one of the two be decided upon so that it would not be necessary to maintain equipment for both tinning and galvanizing. Mr. Birdsall stated that experience had shown that galvanizing—he referred to hot galvanizing—always weakened a wire cable or a chain cable. Mr. Erickson said that the chief reason why the I. A. S. B. favored tinning was that the tin formed a better base for solder. It was moved that the word galvanized be substituted for the phrase "coated with pure tin" and also that a footnote be inserted to the effect that the method of galvanizing (if used) be specified by the customer. This amendment was adopted.

A further amendment was in regard to the torsion test which was amended to correspond to the torsion test for the round high-strength steel wire, it being left to the customer and manufacturer to agree upon the number of turns which the test specimen must be capable of withstanding. The report with these amendments was adopted.

American Cable Proves Best

Reports on flexible 6 x 7 and 7 x 7 steel wire cable were adopted without change. In connection with the report on extra flexible 7 x 19 steel wire cable, Mr. Erickson pointed out that the Roebling cable of this denomination was made up of strands containing each three wires of different size. This resulted in extra strength, and the Roebling cable was considerably stronger than British cable of the same denomination having strands made up of equal wires. It was therefore decided to amend that part of the report relating to this matter to read as follows: "It is to be understood that the strand composing this cable must not necessarily be composed of wires all of the same diameter. With this change the report was adopted.

Mr. Birdsall asked whether it was not necessary to provide an elongation test of flexible cable. To this Mr. Manly replied that such a test was unnecessary as every cable before being put in place on an airplane was stretched to 50 per cent of its tensile strength.

There was no comment on the recommendation for cable reels, which consisted of a dimension diagram and a table. This was adopted.

Next the tachometer drive specification was taken up. It was pointed out that the design of this drive was one of the difficult problems of aircraft engine design. The report as it stood had been revised a number of times and represented much work. Major Vincent, in reply to a question, stated that as far as he knew the Signal Corps was satisfied with the design. It was pointed out that the members of the subcommittee had given the subject very careful attention and that it would be safe to pass the specification as submitted, which was done.

Rubber Hose for Gasoline

Next the specifications for rubber hose for gasoline were taken up. Mr. Tuttle of the Bureau of Standards, who read the report as printed, suggested a number of changes. Under the heading "Chemical Properties" it was specified in the original draft that "no organic matter other than para or plantation rubber shall be used in the preparation of this hose."

Considerable objection to this requirement developed, and he made an amendment that the passage be changed to read as follows: "If organic matter other than para or plantation rubber is used in the preparation of this hose, the amount and identity of such material shall be stated." Mr. Hale of the Goodyear Tire & Rubber Co. said that the rubber manufacturers asked that the first paragraph be eliminated. Concerning Mr. Tuttle's modification he said that the rubber companies would decline to give the ingredients of their product. He thought that the physical tests were very rigid and entirely protected the purchaser. Also, it was not within the province of the S. A. E. to require manufacturers to disclose what might be trade secrets with them. Mr. Tuttle replied that all of the physical tests described were made on new hose and did not bring out the durability of the prod-

uct. Mr. Hale said that in his opinion the physical tests were absolutely adequate. The specifications were based upon the practice of the Royal Aircraft Board of Great Britain and that board did not require the composition to be stated. All sorts of hose, including air hose, water hose and fire hose, were being sold on the strength of physical tests alone.

Another change suggested by Mr. Tuttle, based on recommendations made by manufacturers, was that the percentage of rubber in the hose be not less than 25, instead of 32 as called for in the original specifications. Mr. Crane suggested that the specifications of tubes of larger internal diameter than ¾-in. which "may be made from rubber sheet, in which case they must consist of at least two complete turns" were not sufficiently explicit, and, at his suggestion, the following was added to this paragraph: "And be formed into a complete tube in the further process of manufacture." With these changes the complete report was adopted.

The above was followed in the report by specifications of plain hexagon nuts, ball hexagon nuts, castle hexagon nuts, ball hexagon head bolts and plain hexagon head bolts. Mr. Ehrman, criticizing the manner in which the data regarding these parts were presented, recommended that the basic or nominal size be expressed in decimals of four figures and that all decimals in the tables which represented common fractions of an inch have the fraction added thereto in parenthesis.

Consider Threads of No. 12 Nuts

In connection with this subject, a rather warm discussion arose regarding the number of threads specified in No. 12 nuts. Grover Farnsworth of the Navy Aircraft Department wanted to know why 32 pitch was specified for these nuts, claiming that it was impossible to get dies and taps for this pitch. It appears that the former standard pitch for this size was 28. Mr. Ehrman denied that it was impossible to get the necessary tools for cutting these threads. He asserted that it was impossible to get quick delivery on gages for any of the common size screw threads. If better delivery could be obtained on gages for 12-28 threads it was due to the fact that this thread was in very little use and there was a comparatively small demand for gages of that size. According to Mr. Manly the subject was first taken up with the Signal Corps about a year ago.

The Curtiss Airplane Company at that time was using 12-32 screws in its JN model, and inasmuch as the government wanted quick production of this model, it was decided that no change should be made in the size of the thread used. Mr. Manly said that inasmuch as the 12-32 screw had already been adopted by the Society there remained nothing for them to do but to decide upon nuts that would fit these screws.

Mr. Hanks said that a committee should be appointed to confer with representatives of the Army and Navy and with the I. A. S. B. to clear up any little discrepancies which might arise. According to Mr. Erickson of the I. A. S. B., such a meeting is to be held at Washington on Friday at the new headquarters of the Board.

In the printed report were given tables and illustrations of turnbuckles, shackles, clip ends and clevis pins, and it was explained that these were put in merely for the purpose of giving the committee a chance to check them up for any typographical or similar errors, and that it was not necessary to take any official action on them. Specifications for airplane engine tests were adopted without change, as were the aeronautic engine testing form and the engine weight specification form.

Urge Longer Plug Threads

There was some opposition to the passage of the spark plug shell specification in the form presented. A letter had been received by the committee in which it was claimed that the length of thread was not sufficient to carry off the heat effectively. It was pointed out, however, that spark plugs with ⅝-in. length below the hexagon had now been the standard in automobile practice for two years, and more and more engineers were coming to use it. In further reply to the objection in the written communication it was stated that the heat dispersing capacity was much more a matter of thread fit than of thread length. Mr. Ehrman moved that the angle of the chamfer, which in the report was given as 35 deg. for the lower end and 30 deg. for the upper end, be made 35 deg. for both ends.

Mr. Birdsall advocated the use of a longer thread in view of the fact that spark plugs are now generally screwed into the cylinder wall instead of into the valve caps as formerly. If the spark plug has a long thread the water can be brought close to it, which is not the case if the thread is short. He related an experience where the shell of the plug had become discolored from the heat.

Mr. Manly said that there were not many 200 hp. engines in which the metal of the plug did not change in color when working under full load. This did not matter, as the ability of the plug to withstand high temperatures depended mainly upon the porcelain. The report was accepted with no other amendment than that regarding an equal chamfer of 35 deg. on both ends.

Next on the program was a table of bevel washers. Mr. Manly explained that these bevel washers had always been a source of considerable expense, as they generally involved a milling operation in their production. To reduce this expense it was decided to make them of rolled stock. It is not very practical to punch round washers from this rolled stock, and so Mr. Manly suggested that a series of square washers be added to the round washers, which could be readily produced from the rolled stock by sawing.

These bevel washers are to be made with angles of 6, 12, 24, and 36 deg., and by combining washers, a compound washer can be obtained approaching any desired angle within 3 deg. Besides being cheaper to make, the square washer permits of more accurate alignment of the bevel surface and the bolt. The adoption of this report without change concluded the work of the aeronautic section.

Motorcycle Division Report

William S. Harley, chairman of the Motorcycle Division, made the report of that division, which embodied recommendations regarding sixteen different items. The recommendations regarding the following subjects were adopted without change: Spark control, throttle control, kick starters, clutch pedal, brake pedal, chains, oil and grease cups, cylinder displacement, gearshift, carrying capacity, tires, headlamp mounting lugs and supporting prongs, spokes and nipple.

The recommendation regarding tires is that tires on military motorcycles, rear and side cars shall be of a clincher type, 28 x 3 in. Mr. Wolfe of the Goodyear Tire & Rubber Co. suggested that this be amended to read: "Of the clincher type and fitting a 28 x 3-in. rim." This would take care of over-sized tires, 29 x 3½ in. in dimensions, which are now being used to quite an extent on military motorcycles. Mr. Harley, however, said that these tires were entirely unsuited to motorcycles as now built owing to the fact that there was not sufficient clearance for the tires in the frame, and the division had gone on record as favoring the 28 x 3 in. size. No change was made in the recommendation.

Change Magneto Dimensions

In connection with the magneto dimensions specifications, Mr. Libby of the Splitdorf Electrical Co. recommended that the length of magneto space (from large end of shaft taper) be made 6⅜ instead of 6⅛ in. as recommended, and the width of the magneto space 3¾ instead of 3⅛ in. If the space allowed were smaller than that, it would not accommodate the Splitdorf magneto. This suggestion was accepted and the specifications were then adopted.

Mr. Ehrman pointed out a number of errors in the drawing of the fuel and lubrication pipe fittings and he also recommended that in addition to the dimensions given on the drawing, the root diameter limits of both the male and female threads be inserted. An amendment to this effect was carried and the recommendation was then adopted. It was found that the nipple head depression in the wheel rim as specified was covered by a patent, and inasmuch as it is the invariable rule of the S. A. E. not to standardize any patented article,

(*Continued on page* 140)

Westinghouse Cam Regulated Generator

Designed Specially for Truck Work—Voltage Regulated by a Vibrator Cutting Field Resistance In and Out—Vibrator Is Under Both Magnetic and Mechanical Influences

A CAM-REGULATED generator has been brought out by the Westinghouse Electric & Mfg. Co. for use particularly on army trucks and high-grade commercial vehicles. It is designed to meet all the requirements of the government's specifications for army truck equipment as approved by the Quartermaster General in May, 1917. The generator is being produced at the Shadyside Works of the Pittsburgh concern.

The machines are ordinarily adjusted at the factory to give a voltage not greater than 8 volts at 1 amp. output at speeds up to 2000 r.p.m., and with a load of 15 amp. to give a voltage not less than 7 volts up to 2000 r.p.m. The generator is capable of giving a continuous output of 12 amp. at 7.5 volts, and the range of possible adjustment of the regulator makes it also applicable to some of the higher class passenger or general utility vehicles as well as military trucks.

Fig. 1—Regulator unit of the Westinghouse cam-regulated generator

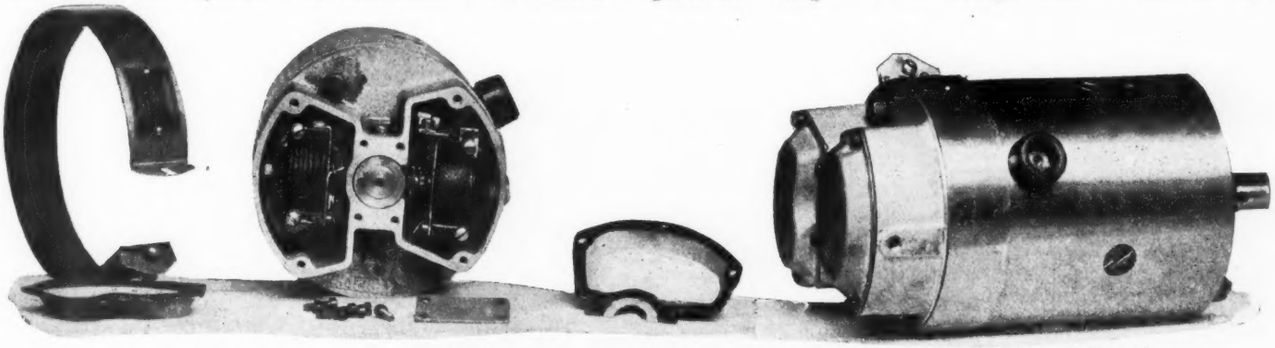
In appearance the generator is similar to other machines of Westinghouse manufacture, with the frame made from steel pipe having a circular section that lends itself to cradle mounting on the engine. The end brackets may be extended to form flanges for end mounting, in which case the cradle brackets are not required. The construction of the armature shaft and regulated generator parts is along conventional lines. Ball bearings are used for the coupled type, while, where the generators are mounted on the gear cases by supporting flanges, large bronze sleeve bearings are employed. These latter are lubricated by a constant stream of oil. The windings are mechanically and electrically strengthened by a double impregnating treatment, making them oil and water proof. Four brushes are supplied on the generator in place of the customary two, and the field coils are securely located on poles and highly insulated from ground. It requires but one wire to connect the generator to the car's wiring system.

It is in the cut-out switch and voltage regulator that the instrument differs from other types. The cut-out and regulating units are mounted within the bracket on the commutator end, and removable covers provide access to both. The cut-out is adjusted to close the circuit to the battery when the speed of the generator has reached such a point as to give 6.5 volts at the generator terminals; it opens with a reverse current of 1 amp. and at a speed below the cut-in speed to avoid any tendency to chatter when the generator is running near the cut-in speed. The cut-in speed varies from 5 to 10 m.p.h., depending on the gear ratio and wheel diameter used on the car.

Regulator Specially Developed

The regulator has been especially developed for truck work. Movement of one of the contacts of the regulator is caused by a cam on the generator shaft so that this operation is positive and contacts are either in intimate contact or entirely open. A slight wiping motion keeps the contact surfaces clean. Regulation is effected by opening and closing of the regulator contacts, thus cutting in and out a resistance connected across these contacts and in series with the field winding of the generator; the time the contacts are closed varies with the speed. The generator will maintain a proper voltage and current output even if the battery becomes disconnected. An opening in the end bracket affords access to the regulator adjusting screw.

The action of the regulator is explained in Fig. 1. The contact affixed to the armature moves back and forth with the latter to and from the end of the armature core as the amount of flux through this core varies. Since this flux varies with the voltage of the generator, the position of the surface of the top contact is at all times determined by the generator voltage. If this voltage tends to rise, the top



Left—Fig. 2—End view of the Westinghouse cam-regulated generator showing cut-out switch on left and regulator on right. Right—Fig. 3—Exterior of the Westinghouse cam-regulated generator. This machine is adapted to cradle mounting

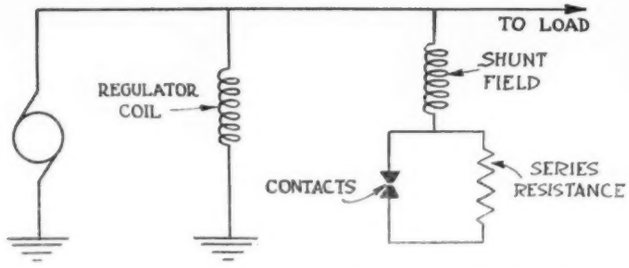


Fig. 4—Approximate wiring diagram of the Westinghouse cam-regulated generator

contact will then be withdrawn from the lower contact.

Since the lower contact is always moving up and down under the influence of the cam, the duration of contact in each revolution will be proportional to the position of the top contact, which in turn is proportional to the voltage. Thus, if the voltage tends to increase the top contact will be withdrawn from its mean position, while if the voltage tends to decrease, due perhaps to lower speed or increased load upon the generator, the upper contact will approach the lower and thus make the duration of contact longer in each revolution. Since the two contacts short-circuit a resistance in series with the shunt field of the generator, the operation is identically that of the familiar Tirrell regulator used in power plants.

Adjustment is made by bending the brass piece at the outer end of the steel frame. By straightening out the crooks in it the armature is moved farther away from the core, and this increases the regulated voltage. By squeezing up the brass piece the armature is allowed to move up nearer the core. This gives the core a greater influence on it and tends to take it away from the contact, thus increasing the length of time during each revolution in which the fields regulating resistance is left in the circuit.

Standards Committee in Busy Session

(*Continued from page* 138)

it was decided to eliminate the dimensions .216″ R and 0.180″ which overcame the difficulty. On the suggestion of Mr. Wolfe, the minus tolerance of the circumference of the rim was changed from 11/64 to 9/64 in., this change having been decided upon by the Clincher Tire Manufacturers Association. With these changes the wheel and rim specifications were adopted.

Mr. Harley stated that the division had also decided upon an 18 mm. spark plug, having been given to understand that this was the size of plug to be used in the Liberty motor truck engines. As the motorcycles will be used largely in conjunction with the trucks, it was considered advantageous to have the same size of plugs in use on both types of vehicles. Since that time, however, it was learned that the ⅞-18 plug would be used on the truck and the action regarding the use of the millimeter plug on motorcycles was rescinded.

The newly appointed roller chain division made its first report, containing recommendations regarding the nomenclature of roller chain parts and a table of roller chain dimensions. The chain sizes recommended were selected from the most generally used existing series, with the addition of a 2½-in. pitch for heavier duty. This series was chosen in order to provide the best practice during the existing war conditions. Other series will be worked out for light duty at high speeds, and heavy duty at slow speeds, and will be influenced more or less by the introduction of alloy steels in future chain manufacture. The chain size numbers indicate the number of quarter inches in the pitch. The report was adopted.

Tractor Division Report

Chairman Parrett of the Tractor Division read the report of that division as formulated at a meeting on the previous day. It was accepted as presented. In the report of the data sheet division it was stated that a new comprehensive index to the data sheets had been prepared and sent out to the members. Suggestions were made that a number of obsolete sheets be eliminated and that several other sheets be revised. This report was adopted.

Miscellaneous Division Report

In the printed report presented to members of the meeting were given complete tables of yoke and eye rod ends, plain rod ends and eye rod ends. Only the two largest sizes in each of these tables, ⅞ in. and 1 in., were new, and the addition of these sizes to the existing standards was decided upon. The subject of bumpers and mounting had been given consideration by the miscellaneous division in co-operation with the Bumper Manufacturers Association and after a careful review of the proper height for both front and rear bumpers, for various conditions of loading, fender clearance and collision, the following heights and dimensions were recommended. The committee also believes that there is a chance for further work along the line of methods of attaching the bumpers.

Table of Standard Bumper Heights and Dimensions

	Front	Rear
Height from center of face to ground	21	22
Over-all length	Between 59 and 60	Between 59 and 60
Bumper face	Flat	Flat
Vertical depth bumper bar min.	2	2½

Dimensions in inches.

The final item in the report of the miscellaneous division was a table of S. A. E. screw threads, containing both the regular S. A. E. and the new S. A. E. fine thread. A diagram showing the pitches corresponding to various diameters of the new fine thread was given in the report of the recent standards committee Washington meeting in AUTOMOTIVE INDUSTRIES. All of the items in the miscellaneous division of report were tables to pass upon.

Marine Division Report

The Marine division presented reports on steel engine couplings, steel reverse couplings, cast iron reverse couplings, shaft couplings and propeller mounts. These were in the form of tables with dimension drawings. The steel couplings called for taper fittings and determined opposition was made to the adoption of this form of fitting by a manufacturer of flexible couplings, who said that the adoption of this sort of fitting as standard would be detrimental to his business, as his coupling could not be fitted to a tapered shaft end.

There was considerable discussion on this point, but inasmuch as it was getting late and there were only a few members of the Standards Committee left in the room, it was found that there was no quorum present, and that no action could be taken on the report. A vote was taken and showed it to be the sense of the committee that with a number of corrections of typographical errors, the report should be adopted as presented. Mr. Smith, who objected to the adoption of a standard for couplings with tapered fittings, will be given a chance to present his views to the Marine Engine Division at one of its next meetings.

There will be a general marine engineering meeting under S. A. E. auspices in this city on Jan. 25, and it is possible that the Marine Division of the Standards Committee will have a meeting at that time. All of the subjects on the program having been passed upon, the meeting adjourned.

Standards Division Meeting

A MEETING of the Tractor Division was held at S. A. E. headquarters on Tuesday. Of the members of the Division, Chairman Dent Parrett and Joseph Van Blerck were in attendance, and Standards Manager M. W. Hanks and P. M. Heldt of *Automotive Industries* were also present. The recommendations formulated at the Minneapolis meeting were gone over in detail. In regard to the suggestion that tractor rims be cut in lengths of 12, 14, 16, 18, 20, 22 and 24 ft., it was pointed out that this resulted in rather large steps (about 7¾ in.) between diameters of successive sizes of wheels. It was decided to compose a letter explaining that it is not the intention of the Standards Committee that tractor manufacturers should change the wheels on their existing models, but that, whenever they are developing a new model they should aim to adopt one of the suggested dimensions. The letter is to be sent to all manufacturers of tractors, who will be asked to criticise the recommendations and to make suggestions in case they cannot adopt them in their practice.

Slight Change in Wording of Specification Blank

A slight change in the wording of the short specification blank, already adopted by the Division, was decided upon, this being to the effect that the speed which is normally used in plowing is to be indicated by a check mark, the word "normally" not being used in the original recommendation.

In connection with the recommendation that a pad of magnetic insulating material at least ½-in. thick be placed under magnetos when mounted on cast iron brackets, a letter had been received by Chairman Dent Parrett from a magneto manufacturer protesting against this recommendation. The manufacturer in question asserted that with many makes of magnetos this pad was unnecessary, and the requirement would be a hardship on tractor manufacturers. Chairman Parrett reported that he had replied to this letter by stating that the recommendation was adopted at a meeting of the tractor division held in Chicago, which was attended by representatives of practically all the magneto manufacturers, and there was no opposition to it. It was decided to report the substance of the letter and of Mr. Parrett's reply to the Standards Committee.

The recommendation regarding tube size for gasoline and oil leads was ratified, though there was a feeling among the members present that an additional, larger size would be necessary for the heavier tractors.

Drawbar Connections

Considerable discussion developed in regard to the proposed draw bar connections. Under this heading specifications are given of the size of stock from which the coupling is to be made, the width of the space for the draw bar, the size of hole for the draw bar pin, and the position of this hole. A drawing accompanies this specification, which contains full dimensions for the coupling. Mr. Van Blerck urged that no dimensions should be given except the width of the space for the drawbar, the size of the hole and the location of same, so as to afford manufacturers and designers a chance of working out the details of the coupling according to their own best judgment. Other members present felt, however, that the design shown in the sketch would be suggestive to engineers, and after a full discussion of the subject it was decided to caption the cut "Suggested Design of Drawbar Coupling."

Electric Vehicle Report

A meeting was also held by the Electric Vehicle Division and the following recommendations were made:

It is recommended that the matter be laid before the different members of the Committee as to whether it is the consensus of opinion that an attempt be made to standardize a specification for motor rating. Mr. Queeney stated that there already is a specification for railway motor practice, and that a specification along similar lines would be helpful. He promised to procure a copy of the railway motor specification and send it to Mr. Hanks, so that all the members of the Division might be supplied with a copy. This railway motor specification will serve as a model for a type of specification for electric vehicle motors.

This Division was requested to standardize the focal length of headlamp bulbs for electric vehicles along the same lines as already done for gas cars, if this be possible. This matter was referred to the Lighting Division and they recommended the standard focal length of 1¼" for both electric and gasoline propelled vehicles.

Standardization of Battery Compartment

Mr. Hanks was instructed to bring up at the Standards Committee meeting the question of whether or not the 1¼" focal length applies to all bulb sizes. If it does apply to all sizes, it should be so stated, and if it does not, the limits should be specified.

Mr. Ford referred to a letter he had received from W. P. Stone & Co., South Boston, Mass., suggesting that their interchangeable battery compartment be standardized. The fact that this battery compartment is patented prevents any action whatever upon this specific type. The subject of compartment sizes is now before the Division.

Mr. Hertner submitted copies of correspondence from representatives of the manufacturers of electric passenger cars. The consensus of opinion is that the battery compartment is so closely allied to the body line of passenger cars that no standard can be adopted which will apply to existing vehicles; if, however, some standard sizes could be worked up, they might be applicable for future designs. It was suggested that the manufacturers agree upon the specific sizes for future use.

Commercial Car Problem

Mr. Whitney, as Chairman of the Standardization Committee of the Electric Vehicle Section of the National Electric Light Association, reported that a Sub-committee had been diligently attacking the problem of commercial cars, and it was his opinion that some results of their work were available. He promised to obtain whatever data and conclusions this Sub-Committee had arrived at and submit them to the Division for action.

This Division had been given to understand that the tire people must be convinced of the merits of the present Whitney test, or the Whitney test must be revised so that it would be satisfactory to the tire people. Several truck manufacturers are buying tires based upon the Whitney method of testing. The matter was put before the Standards Committee once before and was acted upon unfavorably, due to the attitude taken by the tire manufacturers. The only reason that this subject has been in the hands of the Electric Vehicle Division is that the electric vehicle manufacturers have been more interested in obtaining solid tires of high efficiency. With the high cost of gasoline, tire efficiency is becoming more important to manufacturers of gas cars, and perhaps the time is ripe when the subject is of enough general interest for it to be put before the Standards Committee again.

Letter from A. I. E. E.

Mr. Hanks read a letter received January 7 from the American Institute of Electrical Engineers, stating that the A. I. E. E. had no standard specification for electric vehicle cable and that their only cable standards were those on pages 68 to 76 inclusive of the standardization rules. Table XIII on page 71 is probably the best suited. This gives the number of strands and wire sizes for different sized cable. It was suggested that information based upon this table be obtained to show what kind of insulations are being used in regular practice. Recommendations for standardization will then be based upon this information.

The Miscellaneous Division, of which Mr. Ehrman is chairman, extended the table of rod end pins to include pins for ⅞-in. and 1-in. rods.

Latest News of the

Kettering President of S. A. E.

Beecroft First Vice-president —Hinkley, Houston, Glover, Sutphen and Brate Vice-presidents

NEW YORK, Jan. 10—Chas. F. Kettering, vice-president of the Dayton Engineering Laboratories Co., is the president-elect of the Society of Automotive Engineers.

Kettering has been connected with the Dayton Engineering Laboratories Co. since 1909. Prior to that he was engineer in charge of development work on electric apparatus for the National Cash Register Co. He was graduated from Ohio State University in 1904.

David Beecroft, who is directing editor of the Class Journal Co., and has been active in society affairs for a number of years, is first vice-president. The complete slate follows:

President—Chas. F Kettering, vice-president Dayton Engineering Laboratories Co.

First vice-president—David Beecroft, directing editor Class Journal Co.

Second vice-president—C. C. Hinkley, president and general manager Hinkley Motors Corp, representing motor car enginering.

Second vice-president—Geo. H. Houston, representing aviation engineering.

Second vice-president—Fred Glover, Emerson-Brantingham Co., representing tractor engineering.

Second vice-president—Henry R. Sutphen, vice-president Submarine Boat Corp., representing marine engineering.

Second vice-president—H. R. Brate, representing stationary internal combustion engineering.

Secretary-General Manager — Coker F. Clarkson.

Treasurer—Chas. B. Whittelsey, vice-president Hartford Rubber Works.

Councillors 1918

B. B. Bachman, engineer Autocar Co., Ardmore.

H. L. Horning, engineer Waukesha Motor Co., Waukesha, and chairman Automotive Section of the War Industries Board.

C. W. McKinley, chief engineer, Willys-Overland Co.

George W. Dunham, past president.

Russell Huff, past president.

Councillors 1919

Chas. S. Crawford, chief engineer Premier Motor Corp.

Chas. M. Manly, vice-president and chief engineer, Curtiss Aeroplane Co.

J. V. Whitbeck, chief engineer, Chandler Motor Car Co.

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To Have Gasoline Administrator

WASHINGTON, Jan. 10—In addition to the administrators of food and fuel there is now to be an administrator of oil and gasoline. He will operate under Director Garfield of the fuel administration. His name has not been made public, but it is said he will not be connected with any of the large companies. A. C. Bedford of the Standard Oil Co. has thus far acted as chairman of the Petroleum War Service Committee.

During the early stages of control the oil industry will be allowed to continue on its present basis without interference that would not be supported by full information on its position. The initial stages of control will deal almost exclusively with the problems of facilitating distribution and promoting conservation measures. The immediate task which will confront the administration will be the perfection of an organization adequate to handling the complex phrases of the industry which must be dealt with.

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M. A. M. A. Re-elects Officers

NEW YORK, Jan. 9—The Motor & Accessory Manufacturers' Association to-day held its annual meeting and re-elected four retiring directors: Christian Girl, Standard Parts Co., Cleveland; E. H. Broadwell, Fisk Rubber Co., Chicopee Falls, Mass.; E. W. Beach, Manufacturers' Foundry Co., Waterbury, Conn.; L. M. Wainwright, Diamond Chain & Mfg. Co.

All of the officers of the association except the secretary were re-elected as follows: President, C. W. Stiger, Stromberg Motor Devices Co., Chicago; 1st vice-president, C. E. Thompson, Steel Products Co., Cleveland; 2nd vice-president, E. H. Broadwell, Fisk Rubber Co., Chicopee Falls, Mass; 3rd vice-president, T. J. Wetzel, Precision Die & Casting Co.; treasurer, L. M. Wainwright, Diamond Chain & Mfg. Co.; assistant treasurer and secretary, W. O. Rutherford, B. F. Goodrich Co. Mr. Sloan, formerly assistant treasurer, remains a member of the board of directors.

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500 Attend M. A. M. A. Banquet

NEW YORK CITY, Jan. 9—The fourteenth annual banquet of the Motor & Accessory Manufacturers' Assn. held at the Waldorf to-night was attended by over 500 members of the association and guests. After an address of welcome by President Chas. W. Stiger, a combined dinner, vaudeville performance, war lecture, and war movie show took place, and continued until 1:30 a. m. The war talk by Corp. R. Derby Holmes of Boston, and late of an English regiment, was one of the most interesting war talks of the season. This was followed by five reels of Italian war films showing the Italian army fighting in the region of snows and ice, and also the work of the Italian motorboat submarine chasers, dirigibles and airplanes.

Show Hits Old-Time Stride

Weather and Rumors Make First Days Small—Good Net Already—Result Seems Assured

NEW YORK, Jan. 9—The New York show hit its old-time stride to-day after a rather bad beginning. The first day, Saturday, was the end of the coldest spell New York has ever had. People were still sticking close indoors and rumors were afloat that Grand Central Palace was cold.

Monday the people had not fully awakened to the fact that the show was on as big as ever, but by Tuesday, with the newspapers carrying advertising and their usual show stories and the hotels packed to the roofs with automobile people, the city waked up and the city flocked out to supplement the big army of out-of-town people who began to arrive in force.

To-day, Wednesday, the old-time show has "come back." The attendance is as big as last year if not bigger, and the management estimates that if the relapse of the first few days should prove only to be a delayed attendance the last few days might be bigger than ever before.

High-priced Cars Sell Well

Business also is beginning to pick up, and among the high-priced cars, too. Stutz, McFarlan, National, Pierce-Arrow, Packard, Franklin and Marmon report a strong business tone, and Auburn, which looks more to the West than to the East for business, said it felt greatly encouraged with the response it was meeting. Paige reported a good business.

On the accessory floors the feeling of optimism is supreme. People are said to be purchasing heavily, especially of the smaller articles, such as car locks, lenses and other easily carried articles. Ford devices sell in volume.

At the dealer dinners that are being held business experts are showing the dealers why business is bound to be good. The end of the week should see a wonderful stiffening of the backbones of some who came to the show expecting to see an exhibition of gloom and impending disaster, which they have not found.

Jobbers are here in numbers, looking for goods to supply the biggest demand they believe they have ever been able to foresee.

Automotive Industries

No G. M.-Chevrolet Merger Yet

Concerns Maintain Their Relative Independence at Least for Time Being — Declare 3% Dividend

NEW YORK CITY, Jan. 9—Plans for merging the Chevrolet and General Motors companies were again pigeon-holed after a joint directors' meeting yesterday. Wall Street had freely predicted that such a merger would take place, and it had been accepted generally as an almost foregone conclusion that yesterday's meeting would see the deal through. It is very possibly due directly to General Motors war business in trucks, shells and Liberty airplane engines said to total $60,000,000 during 1918 that the deal did not go through.

Both companies have declared a 3 per cent dividend to stockholders as of Jan. 18, the dividend being payable Feb. 1. This is a regular dividend and was simply a matter of form as far as the meeting was concerned, as the directors of the General Motors Co. declared the dividend and then adjourned, after which the directors of the Chevrolet company held their meeting. Directors of both companies stated that there is no immediate intention to consolidate.

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Central Warehouses for Airplane Repair

INDIANAPOLIS, Jan. 6—A $600,000 airplane warehouse is being erected here for the repair of all army airplanes located east of the Mississippi and north of the Ohio River. The building for body repair is 241 x 264, and the motor repair building is 239 x 294. Four large barracks are to be built to house 25 officers and 700 enlisted men in charge of the airplane work.

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Curtiss Output 12-15 Planes Daily

BUFFALO, Jan. 8—Curtiss Aeroplane & Motors Corp. is turning out from 12 to 15 machines daily, and is preparing to increase this output in 1918. The volume of shipments for the last six weeks has been about $3,000,000. It is estimated that by March the monthly turnover will be $5,000,000.

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Wright-Martin Profit $1,000,000

NEW YORK, Jan. 8—It is estimated that the Government contract with the Wright-Martin Aircraft Corp. for 550 Hispano-Suiza motors at $5,000 each will yield $1,000,000 profit, or the equivalent of $1 a share on the company's outstanding common stock. About 200 of the engines have been shipped already and the remaining 350 are ready for shipping instructions. The problem of changing the production from 150 hp. to 220 hp. engine was accomplished without great cost or confusion, and work has already been started on the latest Government order for 4000 Hispano-Suiza motors and parts, making the equivalent of 5500 engines. This contract involves $28,000,000.

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Aircraft Inspectors Band Together

DETROIT, Jan. 5—The Detroit Aircraft Inspectors club, composed of the engineers who construct and inspect airplanes in this city, has been organized for more complete co-operation in the work of the members. Captain James Haeslett, who has charge of the Government aircraft equipment in the city, and Captain Hotchkiss of the Washington division of aircraft equipment addressed the members. The officers elected follow: President, Lieutenant E. T. Jones; vice-president, George Gray; secretary-treasurer, A. T. Davidson. Monthly meetings are scheduled. It is stated that the first of the Detroit built war planes was successfully demonstrated during the past week.

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Coal Still Short in Detroit

DETROIT, Jan. 5—The coal situation still occupies the center of the stage, and receipts have dropped off in the last week. Last week something over 500 carloads were received, but this week only about 150 carloads arrived. Manufacturing plants are still running with limited supplies, and relief is looked for through Government control of the railroads. Flint, Jackson and Lansing are possibly in even worse condition, and two Lansing factories will have to close this week if coal does not arrive.

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Canada Sees Trouble Ahead

MONTREAL, Jan. 5—It having been reported throughout the trade in Canada that the Government proposes to restrict the importation of gasoline and motor cars, the automobile dealers are planning to lay facts before the Government to prove that such action would be harmful to the dominion. The Montreal Automobile Trade Association through its manager, T. B. Kirby, is gathering information and it is probable that a meeting of the trade will be held at an early date.

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Furniture Men Making Airplane Parts

GRAND RAPIDS, Jan. 3—The Bissell Carpet Sweeper Co. is working on a large war contract for airplane parts, which will extend through a long period. This is but one of many received by Grand Rapids furniture manufacturers.

N. A. C. C. Reports Record Shipments

Deliveries Exceed Any Previous Year — Production Slowed by Material Shortage

NEW YORK CITY, Jan. 9—The total shipments of automobiles by members of the National Automobile Chamber of Commerce and by the country in general, for 1917 greatly exceeded the shipments of 1916 or any other previous year in the history of the industry. Taken month by month the shipments during 1917 exceeded those of the previous year with the possible exception of December. There was no slowing up on production until a shortage of materials arose in October, and during October, November and December production figures fell below those of the corresponding months of 1916.

According to reports from the regular monthly meeting of the directors of the National Automobile Chamber of Commerce held to-day the automobile manufacturers have been playing their part in relieving railroads of automobile shipments, because there has been a substantial falling off in shipments during the past few months due to the increased driveaways from factories.

Several factories in the Great Lakes zone, which may be said to include Cleveland, Toledo, Detroit, Pontiac, Flint, Lansing and adjacent places, are driving away a large percentage of cars produced. One distributer in the Southeast drove away over 1000 cars during the month of November.

Some of the large New York distributers are now arranging to drive all of their cars to Buffalo, where they will be stored. Other manufacturers are arranging similar plans to relieve the railroads during the coming months and through the Spring. It is hoped road conditions will not interfere with the plans.

At to-day's meeting, Chairman A. W. Copland, of the Automobile Industries Committee, and Hugh Chalmers, of the same committee, reported at length on the work of the committee in Washington and on its co-operation with the War Industries Board. The committee has done commendable work by way of placing or arranging for Government work other than automobile manufacture with many factories that are slack.

Roy D. Chapin, chairman of the Highways Transport Committee, and Windsor T. White, president of the White Co., reported on the truck conference held yesterday.

The Platform on Which the N. A. C. C. Truck Makers Stand

1—RESOLVED, *That the motor truck manufacturers of the United States, in convention assembled in New York on January 8, 1918, hereby tender to the President of the United States, to the Secretary of War and to the Council of National Defense, their services and co-operation in meeting the transportation needs of the Government and the country, and offer the facilities of their factories to aid in the prosecution of hostilities against the Governments of countries with which the United States is at war. It is resolved, That copies of this resolution be addressed to the President and the Secretary of War.*

2—WHEREAS *the present unprecedented crisis in the railroad transportation service of the country has made imperative an extraordinary development of motor trucking by highway to meet the needs of the War Department of the Government and of the industry and commerce of the United States, and*

WHEREAS *it is essential to the effective use of motor vehicles as a measure of relief of freight and express congestion that the main highways be put and kept in good usable condition for the movement of the products of farm and factory, it is*

RESOLVED, *That the Director-General of the Railroads be urged to raise the embargo against the use of open-top railroad cars for the shipment of road materials and machinery in sufficient time to permit of resumption of highway construction and repair early next spring in the northern states and, if conditions permit, that this portion of the order be rescinded this winter in so far as it affects the Southern States and California.*

3—RESOLVED, *That a committee of five representatives of motor truck manufacturing companies be appointed by the president of the National Automobile Chamber of Commerce to co-operate with and assist the Highways Transport Committee of the Council of National Defense in working out problems arising in connection with the organization and development of transportation by public highway for the relief of railroad freight congestion and to facilitate the movement of military trucks and the transportation of the mails.*

4—RESOLVED, *That the representatives of motor truck companies in attendance at this convention indorse unanimously the work and plans of the Highway Transport Committee of the Council of National Defense and hereby tender the full co-operation of the motor truck industry in developing ways and means for increasing the effectiveness of the motor truck in moving merchandise and other freight and express matter.*

5—RESOLVED, *That the motor truck manufacturers of the United States, assembled in convention January 8, 1918, who view with increasing apprehension the various forms of drastic motor truck legislation already passed and other forms threatened, hereby appeal to the Council of National Defense, asking the council to request the various states in this time of stress when transportation is the need of the hour, to refrain from passing or enforcing any unreasonable legislation that would interfere with motor truck transportation.*

Motor Trucks Will Help Win the War

N. A. C. C. Urges Necessity of Truck Makers and Users Co-operating with the Government—Must Help Relieve Railroads

NEW YORK, Jan. 8—"The automobile industry is more interested in having democracy as usual after the war than business as usual now." This was the stirring remark of Hugh Chalmers made at the Motor Truck Manufacturers' Convention being held in the boardroom of the N. A. C. C. H. L. Horning, Automotive Section of the War Industries Board, said: "The truck has now come to the point of being a national necessity." About 100 of the most prominent truck makers of the country were present.

The keynote of the meeting was service to the Government. This service was expressed in co-operating with the Government motor truck program; in assisting to relieve the railroad congestion by the use of motor trucks and the additional service of the motor truck industry so that manufacturers may better understand the demands to be made upon them and be better prepared to meet them.

He spoke of the new kind of slackers which we have among us and who are not only those who refrain from going to war. He mentioned particularly people who complain about the absence of parlor cars and smokers on railroad trains and concluded by stating that these men were just as much slackers in preventing the full co-operation of our citizens toward winning the war as those who unfairly seek to evade the draft law.

George M. Graham, assistant commercial manager of the Pierce-Arrow Motor Car Co., Buffalo, N. Y., briefly outlined the work which the motor truck industry has already rendered to the Government. He told of the work which motor trucks did on the border with General Pershing's expeditionary force in Mexico, and traced the industry's work from that time up and including the many weeks of effort of the best brains of the motor truck industry in the development of our standardized trucks.

Truck Transport Necessary

The great problem now before the motor truck industry is to prove the feasibility and practicability of employing the motor truck to relieve the acute railroad congestion which is bound to increase as our rolling stock wears out through lack of proper care and as our Government's preparation increases to keep our army of one million men supplied 3000 miles from their base.

Major Edward Orton, Jr., Q. M. C. U. S. A., told of a great work which the Government is now doing in driving its standardized war trucks and other trucks still being shipped on previous orders overland from their points of assembly to the seaboard. He pointed out that the most important eff ts of these overland drive-aways of war trucks are not in the 15,000 freight cars saved for other needs or for the 100,000 tons of freight which they will carry, but instead are the great educational value which these long convoys of trucks will have upon the people of America to make them wake up to the fact that we are really at war.

These trucks will be the first physical contact which a large proportion of our citizenship has had with the materials of the war. We have not yet been bombed by enemy airplanes, nor have our coasts been shelled by the guns of great dreadnoughts lying out of sight of our coast behind the horizon. These war trucks will be one of the first object lessons of the war and of the great preparations which our officials in Washington are making to assure a victory for our arms.

The second great benefit of these drive-aways will be the bringing to the citizenship of the great necessity for overland motor routes and roadways capable of withstanding motor truck traffic and of roads which actually lead somewhere, and do not branch out to obscure points as had been caused by the individual road-building programs of our several states. This need has long been

in existence, but it will be the lesson taught by these war trucks that will bring it to the fore and result in the great development of our national highways. These great drive-aways of our 30,000 or more war trucks will have a bigger immediate military advantage than a commercial one. This will be in the training of the great personnel of truck drivers, truck masters and mechanicians required to keep our trucks in motion.

He briefly outlined the many months of study which were necessary before the first drive-away was successfully accomplished. He told of how engineering reports on the roads had to be secured; how routes had to be selected; how road maps had to be secured from the topographical departments of the several states through which the route led; of building gaps in the proposed road; of repairing such parts of roads selected as were impassable for trucks; of the cooperation which had to be expressed by the state highway departments of the various states to keep the route clear of snow during the winter months and of the necessity of supplying doctors, kitchen equipment, oil-filling stations along the route, sleeping quarters and a plotting of the various truck assembly plants and their relation to the main cross-country route.

Properly Handling Freight

He also told of the great detail work which had to be successfully completed in getting the freight which the trucks will carry to the proper points so that it might be loaded into the trucks. It was also necessary to see that this freight was of the proper kind, size and nature that it could be economically loaded into the prescribed motor truck bodies.

He then told briefly of the plans of the Government for training the drivers of these trucks. He mentioned the possibility of seriously damaging the trucks if run overland by green or inexperienced drivers, and was of the opinion that the Government's eventual policy would be to have a green crew act as observers along with a trained crew on one trip and then to let the green crew take out a new fleet on the second trip. In this way he pointed out that the trucks would be much less liable to be damaged while under the eye of an experienced driver on the seat of each vehicle with the novice. At the present time the personnel for only twelve motor truck companies of thirty-three trucks each had been drafted from the various cantonments for the work. Undoubtedly others will be selected as soon as the standardized war trucks begin coming through in quantity.

David S. Ludlum, president of the Autocar Co., Ardmore, Pa., spoke of the positive necessity of establishing schools where motor truck drivers could be trained instead of trying to give them training for a few hundred miles in the overland drive-aways. He brought out the fact that the great purchase of motor trucks would mount into millions of dollars and that it would be folly to entrust this vast investment to the hands of unskilled men who might abuse the trucks by their inexperience.

He also spoke of the fatality of one of the truck drivers on the Packard train which left Detroit Dec. 14 and arrived at Baltimore Dec. 28. Although one of the rules which every army truck driver must learn is that he must bring his truck to a stop before crossing a railroad track to see if the way is clear, one of the truck drivers was struck by a locomotive on the trip while passing through Warren, Ohio. The truck driver was killed and the truck demolished. Mr. Ludlum brought out the fact that this accident occurred at 2 a. m. and was of the opinion that no night driving should be permitted on the overland drive-aways unless each driver had received a sufficient amount of actual road driving previously. Even then he thought that 10 hours continuous driving was all that should be required of the new drivers now.

Hugh Chalmers made a great appeal for a better understanding of what the war really means to the automobile and motor truck industry. He briefly sketched the work of the automobile industry committee in Washington and how it was partially instrumental in blocking the proposed curtailment of the automobile industry because of the misinformed assumption that it was a non-essential. He stated that there would be no official curtailment of the motor car industry except in so far as the question of materials arose.

Several Shocks to Come

He stated that the citizens of the United States will have to meet several great shocks in the near future. The automobile industry will have to meet these shocks as well as the other great industries of the nation. He told of a recent movement in Washington to cancel the New York and Chicago National Automobile shows in order to save railroad transportation and coal with which to heat the show buildings. It was partially due to the work of his committee that these movements were sidetracked. He pointed out that of all years in the history of the automobile industry 1918 was the one year in which the shows should be continued, in order that the necessary readjustment between the passenger car maker, his distributer and his dealer might be effectively met and that the calling off of the shows at this time would entail a great financial loss of thousands of dollars due to previously arranged contracts and preparations.

He also spoke of the possibility of closing down all the schools and churches in this country for a period of one week. In this connection he said it was also possible that all of the industries might have to shut down completely for one week, including those of the automobile and motor truck, in order to relieve the acute railroad congestion and start off anew under better conditions at the end of the shutdown. He gave it as his opinion that he would rather shut down completely for one week than to run at the present inefficiency with the almost positive assurance that the efficiency of the plants would be further decreased unless the present railroad congestion was immediately removed.

H. L. Horning, of the Automotive Section of the War Industries Board, pointed out that the motor truck has the greatest chance for development in the history of the industry. He pointed out the possible use for from 100,000 to 300,000 motor trucks in the parcel post delivery system of this country, and said that it was necessary for motor truck manufacturers to get behind legislation in Washington to make this possible. With the use of motor trucks in this work made possible through government legislation, the various truck companies would advance the idea of the necessity of the motor truck much more rapidly than they would if they should first try to sell their trucks separately to the Post Office Department. It was also his opinion that the motor truck has not yet been sold to the country at large, and that the surface of the possibility of motor truck use has only as yet been scratched.

Plenty of Gasoline

One of the startling statements made by H. L. Horning was to the effect that there is an over-production of gasoline to-day of more than 1,000,000 gal. a day.

Mr. Horning, in his official capacity in Washington, has already been in receipt of many inquiries from motor truck manufacturers as to obtaining priority orders for the shipment of goods entering into motor truck manufacture, and brought out the fact that notwithstanding that these makers have A-1 priority orders, they could still not get materials. In his opinion, the remedy for this difficulty lies in the motor truck establishing its status as a national necessity. If motor truck makers can prove to the Government the necessity for using more and more motor trucks in order to relieve the freight congestion and can actually relieve it, the status of the motor truck will become firmly fixed and there will be no question as to the various makers not getting sufficient material to produce their vehicles.

He further pointed out that the motor truck is the means whereby our armies in the field can strike the blows which will result in defeating the Germans. The trucks carry the ammunition, the food and all sorts of military supplies, without which these sledgehammer blows cannot be given.

The need for a Federal statute controlling the operation of motor trucks in every State of the Union was the outstanding feature of the talk given by Windsor T. White, chairman of the N. A. C. C. Commercial Vehicle Committee on "Legislation Affecting the Use of Motor Trucks." Mr. White's paper treated of the present non-uniformity of existing laws regarding the operation of motor trucks, and the fact that a truck owner operating his vehicle in more than one State would have to equip his trucks with different sized tires if the various laws were carried out to the letter. In

(*Continued on page* 148)

Coal, the Avenue To Curtailment

Coal-Budget Plan Devised To Curb Non-War Industries by Fuel Administration

WASHINGTON, D. C., Jan. 9—The Fuel Administration has worked out a budget plan of coal allowance by percentage for 1918 to all industries not immediately essential to the conduct of the war and the National interests—and the automobile industry is included in this classification. In other words, the Fuel Administration despite its assurances of no unessential classification, is still headed in that direction. The long forecasted curtailment and stigmatizing classification made in these columns in past issues is again threatening. However, the new plan contemplated by the Fuel Administration does not include issuing a list of the so-called non-essential industries. It is not so brutal. The battle-axe method has been discouraged. A more polite, painless and quiet plan is now adopted. In place of the brutal and direct classification of industries as non-essential, the Fuel Administration expects to force each industry to classify itself as not being essential to war.

The Coal Budget Plan

The method is called the "coal budget plan." Committees representing the large industries of the nation not engaged immediately in war work will be called into conference with the officials of the Fuel Administration. They will be told the amount of coal available for all purposes, the quantities required for war purposes and domestic consumers and the total curtailment of the use of coal necessary to satisfy these demands. They will be asked how they are regarded and what standing they have as to their essential qualifications with the war industries board. They will be asked to volunteer a reduction of their coal consumption for 1918. They will be asked to show the Fuel Administration the best way to accomplish this curtailment and as to how to arrange restrictions so as to affect only the less essential portions of their own business if possible. For example, the Fuel Administration intends to call in the Automobile Industry Committee and try to learn how many passenger cars are used for pleasure and what percentage are used for utilitarian purposes and will then attempt to cut the coal supply to the automobile factories from 100 per cent down to a point in proportion to the percentage of passenger cars required for war work. About one dozen industries have already been called into conference and results promise a saving of 20,000,000 tons, while the total offering from all non-war, which is the new word used instead of non-essential, industries is exepected to be 50,000,000 tons.

The Fuel Administration asks that the automobile industry get in touch with it without waiting for formal notice. It believes that this new plan of voluntary conservation will "forever lay the ghost of the 'cut off the non-essential industries' agitation."

Fuel needed in 1918 for army and navy purposes, for munitions works, for public utilities, for domestic consumers and for factories engaged in war work is scheduled in the budget for 100 per cent fulfillment. With this figure and the estimated production of coal in 1918 as a basis a subtraction shows the amount left for non-war industries. The Fuel Administration when queried about the estimated production for 1918 replied that it was impossible to formulate such an estimate.

Backbone of Industry

Dr. Garfield, head of the Fuel Administration, stated that he realizes that the non-war industries, which have sometimes, as he put it, been miscalled non-essential industries, are the backbone of the country's economic system and that they employ 10,000,000 workers upon whom the nation must depend for bonds and taxes to pay for the war. The percentage of reduction, according to the Fuel Administration, will vary partly upon the advice of the leaders of the industry as to what is practicable and safe shrinkage as compared with the business activity of 1917, and will also partly vary with the character of the business, which means that in proportion as an industry contributes less to the war or domestic necessities it will naturally increase its contribution of self-limitation.

The plan has two advantages aside from the disadvantage of curtailment and stigmatizing classification, and these are:

1. Its elasticity, which will be equalized if the coal production for 1918 is found to be more or less than is now anticipated.

2. Its ability to secure equal compliance by every member of each industry, thus assuring equal sacrifice and no unscrupulous advantage by competitors.

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New Government Labor Plan

WASHINGTON, D. C., Jan. 9—A new plan of labor policies and program for securing labor has been worked out by the Secretary of Labor and the Council of National Defense. The plan includes:

1. A means of furnishing adequate and stable labor supply to war industries by use of a system of labor exchanges, methods of training workers, establishment of an agency for determination of priorities of labor demand, and agencies for dilution of skilled labor.

2. Machinery to provide for immediate and equitable adjustment of disputes between labor and capital without stoppage of work and dealing with wages, hours, shop conditions, etc.

3. Machinery for safeguarding conditions of labor in production of war essentials, including industrial hygiene, safety, women and child labor, etc.

4. Machinery for safeguarding conditions of living, including housing, transportation, etc.

5. Organization to assemble necessary labor data.

6. Information division to develop public sentiment, promote local machinery in industrial plants to help carry out the national program.

Of these agencies the mediation service, labor exchange and bureau of statistics are already in existence. The Secretary of Labor expects to call in for assistance a well-balanced corps of experts representing capital, labor and the public.

Expect $5,000,000 Shell Contract

Jackson Manufacturers Organize $500,000 Corporation to Handle Government Work

JACKSON, Jan. 5—The Jackson Munitions Corp., formed by local manufacturers and business men, and incorporated for $500,000 for the purpose of manufacturing shells, has practically secured a $5,000,000 Government contract. Mayor William Sparks of the Sparks-Withington Co., prime mover of the organization, will spend next week in Washington completing the arrangements, and after his return the board of directors will be elected. Arrangements have been practically completed whereby the plant of the Mutual Motors Co. will be used for the manufacture of large shells, and that of the Jackson Automobile Co. for smaller shells. The smaller industries in the city will also receive proportionate parts of this and other contracts. It is stated that the Government desires the $5,000,000 contract completed by next September. At present about thirteen of the Jackson factories are engaged in Government work.

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Record Sales in Vancouver

VANCOUVER, Jan. 5—The past season has been the most successful in the memory of dealers. Since the beginning of June last, no less than fourteen hundred cars have been sold in local territory. Reports from the local licensing department tend to show also that winter is having little or no detrimental effect on sales. Medium-priced cars have held the lead in point of sales. That the Province of British Columbia is a prolific field, still virgin soil so far as the automobile industry is concerned, is evidenced by the fact that new companies are stretching their tentacles to include the farthest west Province of the Dominion.

One matter that is causing no little concern to dealers locally is the question of deliveries. So far, Vancouver dealers have been singularly fortunate in keeping pace in large measure with demands but it is almost too much to expect that this gratifying state of affairs will continue during 1918.

Vanderlip Preaches Economy

Financier Tells Rubber Club Greater Efficiency, Too, Is a Prime Requisite Today

NEW YORK, Jan. 7—Frank A. Vanderlip, of the National City Bank, and who is now operating for the Government in connection with the war thrift stamp loan campaign, addressed the Rubber Assn. of America to-night at the Waldorf-Astoria, and reiterated those policies which he has been mentioned before as expounding.

Mr. Vanderlip maintained that the individual in our nation should be more economical, and that he should not spend money. He maintains that if we are to win the war we must cease to buy many of the things we have purchased in other years; that we must cease to buy what he termed luxuries, and he is credited with having indicated earlier in the day that the motor car was non-essential. The car, by the way, has long since ceased to be classed by our Government as a non-essential.

Mr. Vanderlip talked of the need for greater factory capacity, but he did not point out any particular use that would be made of factory capacities if all the factories in America offered themselves to the Government to-morrow. He talked of the need for releasing labor for Government work, but he did not point out where men are needed, what they are needed for or anything of that kind.

He is also credited with having stated previously that if a man's old hat will last 6 months longer he should not buy a new hat until 6 months from to-day. He said some people fear that we may disorganize business. He said: "The tragedy of it is going to be that we are not going to disorganize certain kinds of business enough. In the period of such tremendous prosperity, in a time when the wage fund is so great, when the profits of agriculture are so tremendous, it is going to be impossible to take this lesson of economy with 100 per cent efficiency to 100,000,000 people. What I fear is that we shall have the greatest business in luxuries we have ever known, that people will unconsciously exercise their command over labor, over material, over shop room and transportation, and will interfere with outfitting this army."

He said the Government had appropriated $19,000,000,000 for the purchase of raw materials and had been unable to spend this money because there were not enough things produced to spend it for. He did not agree with the policy that we must expand our industries to promote greater production, but indicated that we must cease some of our production in order to make room for war work, which is contrary to the idea of the expansion of industry that is now recognized by most of our readers as the only sound course to follow.

He also stated that the breakdown of

The annual banquet of The Rubber Association of America, held at the Waldorf in New York, Jan. 7

the railroads began long ago, and that it was due to the form of Government control that had been exercised. He said we doubtless have seen the end of Government control as we have known it in the past, and he was loudly applauded by the rubber men when he indicated that greater leniency should have been shown to the railroads, and that they should have been permitted to advance rates and put profits on a better basis during the period when costs of all kinds were rising rapidly.

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Rubber Association Elects Works President

NEW YORK, Jan. 8—The Rubber Association of America has elected new officers. They are: President, B. G. Works, president of the B. F. Goodrich Co.; first vice-president, H. Stuart Hotchkiss, formerly with the United States Rubber Co. and now in government work; secretary-treasurer, H. S. Vorhis, re-elected.

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First Aviators Graduate

WASHINGTON, D. C., Jan. 8—The first group of completely trained American aviators ready for service has been graduated by the air school nearest the front line in France. The men have completed the final courses in aerial photography and observation. All received their commissions with one exception.

Champion Ignition Develops A. C.-Baldwin Speedometer

Will Produce Magnetic Type Named for Albert Champion and Russell Baldwin

NEW YORK CITY, Jan. 10—A new speedometer has been developed, known as the A.C.-Baldwin, which is to be made by the Champion Ignition Co., Flint, Mich. It is a magnetic type, which has been under development for over 2 years and has been tested out very extensively. It will be manufactured at the Champion spark plug factory, the plans being to erect new buildings for its manufacture. Production will not start for some months. The speedometer takes its name from the initials of Albert Champion, coupled with the name of Russell Baldwin who developed the instrument. Mr. Baldwin was for years connected with the Stewart Speedometer Corp.

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"Hot Spot Demonstration"

NEW YORK CITY, Jan. 8—A demonstration showing the value of the Chalmers "Hot Spot" manifold was made today by having one of the touring cars stand for 15 hours on the street near the Grand Central Palace under the observation of an official observer. The motor was stopped for that period during which thermometers showed the temperature to average below 30 deg. Fahr. all the time. At 10:30 at night, after the 15-hour stop, the motor was officially started. It required 8 seconds with a starter before the first explosion occurred. After this there were one or two stops when the starter had to be again used but 41 seconds after the first attempt the motor took hold and began accelerating.

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Reo Prices Changed

DETROIT, Jan. 9—The following prices on Reo models will be effective immediately:

Model	Price
R, 4-cylinder, with rod top—roadster	$1,285
S, 4-cylinder	1,085
(same with Rex top)	1,260
T, 4-cylinder (either touring or roadster model)	1,225
M, 6-cylinder touring or roadster	1,550
(either rod or Bonnet top).	200 extra
F, Speed wagon chassis	1,100
(with express body)	1,175
J, 2-ton truck	1,800
(with stake body)	1,950

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Schwerdtseger Air-O-Flex Engineer

DETROIT, Jan. 10—F. W. Schwerdtseger has been appointed designing engineer of the Air-O-Flex Automobile Corp. He was formerly chief engineer of the United States Motor Truck Corp. and latterly has been connected with the Federal and Denby companies.

Motor Trucks Will Help Win the War

(*Continued from page* 145)

some cases the trucks which could be operated in one State could not be run in another on account of the difference in the existing laws.

S. M. Williams, of the Garford Co., Lima, Ohio, made an appeal for the immediate building of national highways suitable for continuous motor truck traffic. These roads will have to come first because our present thoroughfares are not able to withstand the greatly increased amount of freight which trucks will have to carry over them within the next year.

J. F. Winchester, secretary of the Motor Truck Club of New Jersey, told of unfair laws controlling the operation of motor trucks in his State, and of how from 60 to 70 per cent of all the trucks operating in New Jersey at the present time will be barred if the new law were inforced to the letter. He brought out the fact that according to the present law, which went into effect Jan. 1, 1918, 5-ton trucks like the Pierce-Arrow, Packard, Mack and others which carry over 66 per cent of their total load on the rear wheels, would not be allowed on the road if the present reading of the law that not more than one-third of the total weight be carried on any one wheel were strictly enforced.

Roy D. Chapin, chairman of the Highways Transport Committee, told of the great need of transportation in order to win the war. He mentioned the inadequacy of our present rail, inland water and ocean transportation, and of the great possibility of motor truck haulage provided suitable roads were built and properly maintained.

The great reliance which the Government departments are now placing upon the motor trucks was brought out by a request made to the Highways Transport Committee by the Shipping Board asking that the war trucks driven overland carry parts of ships now urgently required at the yards along the Eastern seaboard. The work which trucks can accomplish in relieving the present terminal congestion was also discussed, and the necessity for good roads kept opened all the year around made evident the trucks were to succeed in this important work.

The problem of return loads must also be solved if the trucks are to operate at their maximum efficiency. Mr. Chapin told of the plan now being introduced in the State of Connecticut in which a Return Loads telephone number be placed in the telephone directory of each city. Then if a driver carries a load from one city to the other, all he has to do is to call up Return Loads in the city to which he has driven and inquire if there are any loads to be returned to the city from which he has come.

George H. Pride, also a member of the Highways Transport Committee and himself an operator of a large fleet of motor trucks, told of the great possibility of motor truck use in emergencies where time is paramount; in the delivery of express material; in the haulage of high grade or high rate L. C. L. freight shipment; of the possibility of eliminating grating when goods are hauled by trucks, and of combined long inland water way hauls by garages and short motor truck hauls at each end of the route.

The positive need for a new type of motor truck road built upon a new engineering and logical basis was gist of the remarks of George C. Diehl, who is chairman of the Good Roads Committee of the American Automobile Association.

The necessity for and the probable appointment of one centralized Government purchaser of motor trucks in Washington was the high spot of the important address of Christian Girl, director of production, military truck division, Quartermaster Department U. S. A. Mr. Girl outlined briefly the development of the Government motor truck program and of the necessity of the truck industry selecting a representative in Washington to assist the Government in carrying out this vast undertaking. He favors putting the burden of the production of suitable motor trucks in sufficient quantities to make possible the Government's ambitious program directly upon the motor truck industry. Such a move would greatly simplify matters and will undoubtedly come to pass within a short time.

Formula for Tractor Radiators

Slower Fan Speeds and Larger Sizes Recommended — 3% Engine Power for Fans

MINNEAPOLIS, Jan. 5—With the thought of clarifying the atmosphere with regard to radiators for farm tractors, and the many problems connected therewith, A. B. Modine, of the Modine Mfg. Co., manufacturer of tractor radiators, gave one of the most comprehensive expositions of this subject that has ever been given, before the Minneapolis Section of the Society of Automotive Engineers at its January meeting.

Mr. Modine really spilled the beans so far as the tractor radiator question is concerned and spoke in no uncertain terms as to what were the necessities in the way of changes for tractor cooling. After discussing the questions of temperature rise in the air to that of the velocity of the air, he proposed a standardized air velocity to gross radiator area of 2000 ft. per minute.

Mr. Modine went into the question of fan capacity, and stated that while as high as 4½ per cent of the engine power was in some cases necessary to drive the fan, he believed not more than 3 per cent should be required. He recommended larger fans and slower speeds as a means of higher efficiency, and submitted a series of sizes and speeds for fans suitable for different engines ranging from 20 to 50 hp.

Mr. Modine has made a very broad investigation of temperature rise of the air, with the result that during the year there should be a conservation of several million pounds of copper in radiator construction, which copper otherwise would have been needlessly used. In this work he approached the subject under two heads, namely, water delivery and air velocity.

The amount of heat given off from a source is proportional to the difference in temperature between the radiating body and the air. Further, the loss of heat by convection is nearly proportional to the difference in temperature between the hot body and the air. With this accepted, the problem is that of maintaining the surface of a radiator at as high an average temperature as is practical, and this becomes a question of water circulation.

The subject then becomes a question of choosing a standard for circulation that will give practical pump sizes and still maintain a reasonably small temperature drop throughout the radiator.

With this problem in view, Mr. Modine proposed as a standard a rate of water circulation that will give a temperature drop to the water circulated through the radiator of not more than 5 degrees.

In applying his conclusions Mr. Modine declared that such a standard would check up well with that group of tractor engines of 20 hp. providing a few of the engines would run their 18-in. fans at a higher speed than 1450 r.p.m. In the 30-hp. division L-head engines the radiators used show an actual size of 12 per cent larger than that proposed by the Modine standard.

In the 30-hp. valve-in-the-head division the radiator based on the Modine standard would be 3 per cent larger than that in actual use. The same is true of the 35-hp. L-head engine division. In the 40-hp. division the radiator size required under the Modine formula checks exactly with the size of radiators in use. In the 50 hp. size the formula radiator is 12 per cent larger than those in use.

After a further analysis of radiator size in relation to engines, Mr. Modine recommended larger fans with slower speeds, and declared that the power consumption for fan drive should not be more than 3 per cent of the rated engine power. He considered that a consumption of 4½ per cent of the rated engine power for fan drive is too high.

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Triangle Truck Prepares for Production

ST. JOHNS, MICH., Jan. 8—The Triangle Truck Co. has increased its capital stock from $50,000 to $100,000 and is preparing for active production. The first 1½-ton truck was completed this week and a new factory is in process of construction.

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National Hearse to Issue $100,000 Stock

GRAND RAPIDS, Jan. 8—The National Hearse & Motor Co. will issue $100,000 of 7 per cent preferred stock, with dividends payable quarterly, in order to take care of the increasing business. The company is operating at full capacity, and sells $40,000 worth of cars each month. The business for 1918 shows an increase of 100 per cent over that of last year.

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General Vehicle Plant Sold for $861,000

LONG ISLAND CITY, Jan. 8—The plant of the General Vehicle Co. has been sold to the United States Government. The consideration was $861,000, and not $2,500,000, as was rumored last month.

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	48	50	..
*J. I. Case T. M. Co. pfd.	73	75	—2
Chalmers Motor Co. com.	2	4	..
Chalmers Motor Co. pfd.	..	50	..
*Chandler Motor Co.	71	72½	+5
Chevrolet Motor Co.	113	115	+20
*Fisher Body Corp. com.	28	34	..
*Fisher Body Corp. pfd.	70	87½	..
Fisk Rubber Co. com.	38	43	—2
Fisk Rubber Co. 1st pfd.	98	103	..
Fisk Rubber Co. 2nd pfd.	60	70	..
Firestone Tire & Rubber Co. com.	98	100	+2
Firestone Tire & Rubber Co. pfd.	96	98	..
*General Motors Co. com.	114	115½	+7½
*General Motors Co. pfd.	82	83½	+5½
*B. F. Goodrich Co. com.	39	40	+3
*B. F. Goodrich Co., pfd.	93	97¼	—1¾
Goodyear Tire & Rubber Co. com.	150	154	+14
Goodyear Tire & Rubber Co. pfd.	95	97	+3
Grant Motor Car Corp.	1½	3	+1
Hupp Motor Car Corp. com.	2	3	+1
Hupp Motor Car Corp. pfd.	72	78	..
International Motor Co. com.	15	16½	+3
International Motor Co. 1st pfd.	33	40	+15
International Motor Co. 2nd pfd.	15	20	—5
*Kelly-Springfield Tire Co. com.	43½	45	+4
*Kelly-Springfield Tire Co. 1st pfd.	75	85	+7
*Lee Rubber & Tire Corp.	15	16	+1½
*Maxwell Motor Co., Inc., com.	27	27¾	+3¼
*Maxwell Motor Co., Inc., 1st pfd.	58	58½	+3½
*Maxwell Motor Co., Inc., 2nd pfd.	21½	21½	+ ½
Miller Rubber Co. com.	130	140	..
Miller Rubber Co. pfd.	95	98	..
Packard Motor Car Co. com.	95	103	..
Packard Motor Car Co. pfd.	92	96	..
Paige-Detroit Motor Car Co.	14	16	+3½
Peerless Truck & Motor Corp.	12	14	..
Portage Rubber Co. com.	109	111	..
Regal Motor Car Co.	..	23	+3
Reo Motor Car Co.	16	18	+2
*Saxon Motor Car Corp.	8	9	+1½
Springfield Body Corp. com.	..	..	..
Springfield Body Corp. pfd.	..	..	..
Standard Motor Construction Co.	9	10	+1½
*Stewart-Warner Speed. Corp.	47	49	+4
*Studebaker Corp. com.	50	51	+5
*Studebaker Corp. pfd.	91	94	+3
Swinehart Tire & Rubber Co.	16	26	..
United Motors Corp.	21⅜	21½	+2½
*U. S. Rubber Co. com.	53	54	+2
*U. S. Rubber Co. pfd.	97¼	98	+4
*White Motor Co.	38	39	+2
*Willys-Overland Co. com.	20	20½	+1
*Willys-Overland Co. pfd.	76	77	+2
Standard Parts Co.	..	70	—8

*At close Jan. 5, 1918. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.	7½	8½	..
Bower Roller Bearing Co.	19	..	..
Chevrolet Motor Co.	113	115	+21
Commerce Motor Car Co.	4	..	..
Continental Motor Co. com.	5⅞	6⅛	+ ⅜
Continental Motor Co. pfd.	..	..	..
Edmunds & Jones com.	..	..	..
Edmunds & Jones.	80	90	..
Ford Motor Co. of Canada.	165	..	+15
Hall Lamp Co.	..	14½	..
Michigan Stamping Co. com.	12¼	12⅝	+ ¼
Motor Products	..	..	..
Packard Motor Car Co. com.	89	92½	—1
Packard Motor Car Co. pfd.	..	91	..
Paige-Detroit Motor Car Co.	15	16	+2⅞
Prudden Wheel Co.	12¾	..	+2
Reo Motor Car Co.	16¼	16½	+ ⅞

INACTIVE STOCKS

Atlas Drop Forge	..	32	..
Kelsey Wheel Co.	70	78	..
Regal Motor Car Co.	..	26½	..

1000 S.A.E. Members Added in 1917

Membership Increased 47% and Now Totals 3119—Big Dinner Attendance Sure

NEW YORK CITY, Jan. 9—At the closing meeting of the 1917 Council of the Society of Automotive Engineers held to-day, the rolls of the society showed a total membership of 3119 as of Jan. 1, 1918. This represented an increase of 998 members during the year. As the membership a year ago was 2121, the increase during the year approximated 47 per cent.

The membership committee reported that for the S. A. E. War Dinner to be held in Chicago, Friday, Feb. 1, approximately 861 tickets have already been sold. This gives evidence that the entire seating capacity of the New Morrison Hotel should be sold out some time in advance of the meeting.

For the Special Motor Boat Dinner to be held in New York, Friday evening, Jan. 25, nearly 100 tickets have already been sold.

The total seating capacity of 1000 at the Automotive Industries Dinner at the Hotel Biltmore on Thursday evening, Jan. 10, in connection with the annual meeting of the society, has been taken up, and there is a waiting list of over fifty.

It is possible that there will be a special tractor dinner at Kansas City in connection with the tractor show to be held in that city.

Kanary Manager for United Motors

GRAND RAPIDS, Jan. 8—M. H. Kanary has been appointed general manager of the United Motors Co., succeeding George P. Sweet, who recently resigned to accept a commission as lieutenant in the motor truck division, Aviation Section of the Signal Corps, at Washington, as was previously announced in AUTOMOTIVE INDUSTRIES. Kanary is president and general manager of the Samson Trailer Corp., Grand Rapids, and also president of the Chicago Structural Steel Co., Chicago.

Fuller & Sons in New Plant

KALAMAZOO, MICH., Jan. 8—The Fuller & Sons Mfg. Co. is now manufacturing in its new plant. This plant has approximately 100,000 sq. ft. of floor space, and consists mainly of reinforced concrete buildings of fireproof construction. Steel sashes are used to give a maximum amount of daylight, and the building is heated by forced circulation.

Fire in Perlman Rim Factory

JACKSON, MICH., Jan. 9—The Perlman Rim Co. was damaged to the amount of $100,000 yesterday by a fire supposed to be of incendiary origin. The Government work being done in the factory was not affected, and the general production will be delayed only 48 hours.

King Prices Increased

DETROIT, Jan. 7—The following are the prices on the new models manufactured by the King Motor Car Co.:

Model	Former Price	Present Price	Increase
7-pass. touring	$1650	$2150	$500
4-pass. Foursome	1700	2350	650
3-pass. roadster	1585	2150	565
7-pass. convertible sedan	2300	2950	650

Wire wheels are extra on all models except the Foursome, and this is regularly equipped with wire wheels and 32 x 4½ cord tires.

New Prices for Dort

NEW YORK, Jan. 5—New prices for the Dort were made public to-day. The five-passenger touring car and the roadster, which were $725, are now $865. In the four-season line, the sedan, which was $1,095, has been made $1,265; the sedanet, a convertible type, has been raised from $845 to $1,000. A new coupe model not heretofore manufactured has been brought out at $1,265.

10 Per Cent Drop in Exports

November Shipment $1,114,767 Less Than October—Average for 11 Months Correct

Mos.	Cars	Value	1917 Trucks	Value	Parts
Nov.	5006	$4,820,738	1435	$3,430,162	$2,535,230
Oct.	5536	4,481,127	1333	4,374,470	3,045,300
			1916		
Nov.	5337	4,016,930	1655	5,175,114	2,151,434

WASHINGTON, Jan. 8—Export figures for the month of November show a decrease in value for that month as compared with October, of 10 per cent. There were 530 less passenger cars exported, but the increase in value shows a gain of 7 per cent, equal to $339,611. Although the number of trucks exported during November was 102 greater than the October figure, there was a decrease in value of $944,308, or 27 per cent. The decrease in the value of parts exported was 17 per cent.

Australia was our largest customer for passenger cars, having purchased 673 at a cost of $551,859. Argentina followed with a bill of $355,443 for 485 cars. England bought almost the entire shipment of trucks, since 1037 out of a total of 1435 exported were sent to the United Kingdom. The value of the trucks shipped there was $2,472,390.

The most noticeable drop was the number of cars sent to Canada. During October, 1020 at a cost of $676,483 were sent, but the November figure is only 325 cars at a cost of $291,838. Likewise, Canada's truck purchases in October amounted to $69,709, whereas in November they were only $36,092.

The shipment for the month of November likewise shows a decrease of 5 per cent or $557,348 as compared with November, 1916. The figures for November, 1917, in spite of the decrease maintain a correct average for the year, being almost exactly 1/11 of the value of exports for the 11 months ending Nov. 30, 1917.

Exports of Automobiles, Trucks and Parts for November and Ten Previous Months

	November				Ten Previous Months			
	1916		1917		1916		1917	
	No.	Value	No.	Value	No.	Value	No.	Value
Passenger cars	5,337	$4,016,930	5,006	$4,820,738	57,036	$40,066,427	59,442	$46,982,008
Commercial cars	1,655	5,175,114	1,435	3,430,162	17,572	49,181,460	13,431	34,390,904
Parts, not including engines or tires	.....	2,151,434	.....	2,535,230	.....	22,243,227	.....	26,791,289
	6,992	$11,343,478	6,441	$10,786,130	74,608	$111,491,114	72,873	$108,164,201
					BY COUNTRIES 1917			
	Passenger Cars		Trucks		Passenger Cars		Trucks	
Denmark	.....	.....	.....	.....	247	223,616	.....	.....
France	88	212,704	68	240,546	1,349	905,015	2,542	7,831,851
Norway	1	2,600	.....	.....	676	715,585	.....	.....
Russia in Europe	202	454,781	57	185,802	720	1,721,781	600	1,914,318
United Kingdom	123	168,675	1,037	2,472,390	1,310	1,860,852	7,355	19,700,594
Canada	325	291,838	29	36,092	14,586	11,082,919	725	949,180
Cuba	260	297,063	.....	.....	2,635	2,314,586	193	622,883
Argentina	485	355,443	.....	.....	3,901	2,583,560	.....	.....
Chile	337	417,592	.....	.....	3,401	2,879,943	.....	.....
British India	6	5,755	.....	.....	1,509	1,165,158	.....	.....
Dutch East Indies	408	374,820	.....	.....	2,144	2,083,299	.....	.....
Russia in Asia	.....	.....	.....	.....	260	419,463	.....	.....
Australia	673	551,859	.....	.....	4,135	3,199,318	.....	.....
New Zealand	351	304,262	.....	.....	2,682	2,029,140	.....	.....
Philippine Islands	53	34,817	.....	.....	989	742,788	.....	.....
British South Africa	219	174,545	.....	.....	3,189	2,321,455	.....	.....
Other Countries	1,475	1,173,984	244	495,332	15,709	10,733,530	2,016	3,372,078
	5,006	$4,820,738	1,435	$3,430,162	59,442	$46,982,008	13,431	$34,390,904

Second Truck Train Ends Trip

46 Pierce-Arrows Arrive at Governor's Island After Trip from Buffalo

NEW YORK, Jan. 8—The largest fleet of government war trucks yet driven overland arrived at Governor's Island today after a 300-mile trip from the factory of the Pierce-Arrow Motor Car Co., Buffalo, N. Y. The train consisted of forty-six 5-ton Pierce-Arrow trucks, manned by 100 members of the Twentieth U. S. Engineers in command of Capt. J. K. De Loach and Lieut. G. C. Eastman. The convoy left the Pierce-Arrow factory on New Year's morning and ran east across the State to Albany and then followed the Hudson River Valley on the eastern side of the river down through Ossining, Peekskill and Yonkers to New York.

Much Snow Encountered

Much snow was encountered on the trip and the temperatures often fell below zero, requiring that the trucks be given the best of care in order to prevent the engines from freezing up. Very little preparations had been made by the State Highway authorities, so that the leading truck of the fleet was equipped with a snow plow to clear away the drifts so that the rest of the train could follow. The personnel of the fleet was treated royally in every one of the large cities through which the train passed.

The trucks were made up into three sections, each accompanied by a trained Pierce-Arrow mechanic to assist the drivers in making repairs in case of trouble on the road. Two drivers were assigned to each truck and motorcycle outriders kept Captain De Loach in touch with the three sections all along the route.

Drivers Billeted in Factory

The men of the Engineering Corps which drove the trucks received a week's training at the Pierce-Arrow plant before the start of the trip. They were billeted in the Pierce-Arrow plant, where a large room was cleared for the purpose and where the men set up their folding cots that form a part of their regular equipment. Meals were served in the main dining room of the factory and smoking and lounging rooms were set aside in another part of the factory for the drivers' comforts.

Operators Were Trained

Each of the men underwent an intensified week of instruction laid out by the Pierce-Arrow truck engineers in order to familiarize him with the details of construction and the operation of the truck. The standard instruction book furnished by the Pierce-Arrow company was used but augmented by special lectures on the various parts of the equipment. The last portion of the course was devoted to intensified road driving under the watchful eye of expert instructors of the Pierce-Arrow company.

Before the beginning of the trip, all of the men received some actual overland driving experience when twenty-three of the trucks, lacking bodies, were driven to Dunkirk, N. Y., 47 miles from Buffalo. At Dunkirk each truck was fitted with a body, an extra body loaded in knocked-down form, and the entire fleet driven back to Buffalo.

Gotfredson Heads Saxon

DETROIT, Jan. 10—Benjamin Gotfredson was elected president of the Saxon Motor Corp. at a meeting of the board of directors held in New York this week. Mr. Gotfredson will take the place formerly occupied by Harry W. Ford. He has been a stockholder in the Saxon organization for some time and has been more or less identified with the activities of the company. Mr. Gotfredson is president and organizer of the American Auto Trimming Co., Detroit.

Abbott Sees Trouble

OVERLAND, OHIO, Jan. 4—An involuntary petition in bankruptcy was filed in the Federal Court Friday against the Abbott Corp., manufacturers of the Abbott passenger car. It is estimated that the assets of the corporation are $50,000 and the liabilities about $200,000. A. W. Gardiner, secretary of the Abbott Corp., states that the assets will reach a much higher figure. Concerning the bankruptcy proceedings, the statement of the company is that the plant has temporarily suspended operations, and that it is still believed that the contemplated merger of the Abbott Corp. and the Hal Motor Co. will still go through. It is the plan of the combine to make Abbott and Hal passenger cars, and bring out a motor truck.

Government Wants Women Drivers

WASHINGTON, D. C., Jan. 8—The Depot Quartermaster of the War Department has asked the Civil Service Commission to provide a list of women eligible to drive motor trucks. The Department will use one hundred women motor truck drivers on the streets of Washington at $70 per month to start. None of the drivers will be sent abroad.

Labor Department Has New Bureau

WASHINGTON, D. C., Jan. 8—The Department of Labor has organized a new bureau called the United States Employment service, which is an enlargement of the previous immigration service and includes the two auxiliary bodies, the United States Public Service Reserve and the United States Boys' Working Reserve. It is planned to secure the mechanics needed in the shipbuilding industry through this new bureau. J. B. Densmore has been appointed National Director and will be assisted by Robt. Watson and Charles Clayton.

Vanderlip's Opinions Criticised

Industrial Organizations Object to His Proposed "Labor Saving" Methods

NEW YORK CITY, Jan. 9—The views of Frank A. Vanderlip, president of the National City Bank, and who is now making speeches on the war-saving certificate problem, are arousing the criticism of many industrial organizations, which take objection to his statements that those industries not directly connected with the war should go out of business in order to liberate labor or what Mr. Vanderlip describes as more necessary industries. Automotive Industries for 2 weeks has been taking issue with Mr. Vanderlip's statements, showing that there is not the shortage of labor which he would have it understood there exists, and that shortage of clothing for the soldiers was not in any wise due to workers being used in industries which Mr. Vanderlip would put out of business.

It is believed that the National Automobile Chamber of Commerce has been taking cognizance of Mr. Vanderlip's statements and that not a few organizations, among which might be mentioned certain communities of department stores, will take issue on the points in question.

It would seem an opportune time for various industrial organizations that are the subject of Mr. Vanderlip's remarks to bring together the desired information on this subject. They would be performing a patriotic service in a presentation of the situation that would state the facts.

Kendall Tire Option on Ben-Hur Plant

WILLOUGHBY, OHIO, Jan. 3—The Kendall Tire & Rubber Co., Akron, has taken an option on the 9-acre plant of the Ben-Hur Motor Co. here. The factory is a 2-story, 150 by 400 building.

Goethals Also Transportation Head

WASHINGTON, D. C., Jan. 8—Major-General George W. Goethals of the Quartermaster Corps has been appointed to serve also as Director of War Department Transportation. This means a co-ordination and co-operation of motor truck design and production and insures economy in the use of them and in their maintenance. In the past the Ordnance, Engineers, Signal Corps, Aviation Service and Coast Artillery have been purchasing trucks, tractors and other motor vehicles individually.

New Engine Company in Brooklyn

BROOKLYN, N. Y., Jan. 8—The High Efficiency Motor Corp. has been organized with $200,000 capital by R. E. Weber and W. Rabsilber, Brooklyn, and M. Lewenthal, Hoboken, N. J. The company will manufacture motors, engines and automobiles.

Industrial Review of the Week

A Summary of Major Developments in Other Fields

ANTHRACITE PRODUCTION FAVORABLE

The production of anthracite was naturally slightly curtailed last week on account of the holidays. This curtailment, however, was not as great as is often the case, since many of the miners observed only Christmas Day and did not take the three days to two weeks' lay-off which they frequently do at this season of the year. The intense cold which descended upon the eastern portion of the United States with temperatures in many instances well below the zero mark, and exceptional for this territory, coupled with a decided shortage of fuel throughout the East generally, caused considerable suffering in many localities. So far as is known, little advantage was taken of the stringent conditions by small retailers to boost the price to exorbitant levels. One or two instances of this kind have, however, come to light, and the offenders were promptly arrested. The larger towns and cities, while suffering to a considerable degree, were probably not in as bad condition as some of the country districts. Centers of dense population, such as New York and Philadelphia, may be relieved of coal scarcity much more easily than where the population is scattered. The orders of Secretary McAdoo throwing open to coal traffic the passenger tunnels of the Pennsylvania Railroad doubtless do much to relieve fuel scarcity in some of the boroughs of New York City.

The demand for bituminous coal shows no signs of lessening or abating. The steam demand, which has for months been insistent, is now quite as much so as ever. Many industrial plants, some of them engaged in war munition work, have been compelled to shut down for more or less extended periods, while many others are operating on a day-to-day supply. As has been the case heretofore, much of this stringency could be relieved if transportation facilities were available. There is little question but that New England, which ordinarily gets a large portion of its soft coal by water, will this year be compelled to ship it in all-rail from the mines of Pennsylvania and West Virginia. There is not, and of necessity will not be, much choice exercised as to the grade or quality of coal to be secured. What is needed is something that will burn and make steam. It makes little difference whether this is slack, run-of-mine or lump. The price is, and has been for some time, an entirely secondary consideration. Transportation facilities have also been considerably affected by the cold weather throughout the Middle West. In this region many mines are working two or three days per week where the operators and miners would gladly work them six or possibly even seven days per week if cars for loading could be secured. It is yet too early to say what government control of the common carriers will do to relieve the situation, but it is strongly hoped that a gradual improvement will take place. Many schemes have been brought forward, tending toward the conservation of fuel. Among the most prominent means is that of lightless nights. In many cities one or two such nights are observed each week, while it is strongly urged that at least six be observed in the future. Lightless nights at present means the abolition of glaring electric signs and similar electrical displays. In many instances the abolition of street lighting, either wholly or in part, might well be followed. It would appear that at least when the moon is full, or nearly so, and the ground is covered with snow, there is little real need for street lighting except at dangerous street crossings and similar localities. Throughout the entire country there is a decided and insistent demand for both domestic and industrial fuel.—*Coal Age.*

A New Service

¶ *Herewith* AUTOMOTIVE INDUSTRIES *supplies for the benefit of its readers a general summary of important developments in other fields of business. This is rendered possible by the editorial co-operation of leading industrial publications which are recognized authorities.*

By compressing the general industrial situation into this form we hope to give our readers a clear and comprehensive idea of up-to-the-minute developments which they could otherwise secure only with considerable expenditure of time and effort.

BLAST-FURNACE OPERATION DEMORALIZED

The first week in the new year has brought blast furnace and steel works' operation to the verge of complete demoralization. Western blizzards have made vastly worse what has been for weeks a serious situation and embargoes on shipments have made conditions at rolling mills almost hopeless.

Scores of blast furnaces have been banked in the Pittsburgh, Youngstown, Wheeling, Cleveland and Chicago districts. Steel works in the same territories have been able to operate at but 50 to 75 per cent of capacity. The East, while spared fresh snow blockades, has had record low temperatures and so little fuel has been delivered to steel plants that working schedules have gone to pieces. Never has the industry been so generally crippled or with so poor a prospect of any early return to normal conditions.

December pig iron statistics show the sharp cutting down of production in the second half of the month, and the January showing will doubtless be worse. The total of coke and anthracite iron last month was 2,882,919 tons, or 92,997 tons a day, against 3,205,794 tons in November, or 106,859 tons a day. Capacity active Jan. 1 was only 93,500 tons a day, against 106,953 tons on Dec. 1 and only 324 furnaces were in blast Jan. 1, a loss of 24 in the month.

So far as the market is concerned, the relation of supply and demand growing out of the serious operating conditions is secondary to question of Government price fixing. Reasoning that price changes will almost certainly be downward, buyers find no reason for contracting except that of getting a none too certain place on rolling mill schedules, and sellers are not making haste to write contracts that are likely to be revised from without.

Among questions raised by buyers is this: If there are new prices April 1 will they apply to deliveries carried beyond that date, even though contracted to be made in the first quarter? An authoritative answer is that they will.

Lower Prices Coming

While Washington assurance is given that no price changes are contemplated that will reduce steel production by going below costs of small producers, there is an evident purpose to reduce prices obtained by integrated companies. By the Pomerene bill or in some other way a Government control is aimed at that will take over all output, but at different prices to different producers. The market price would then be an average and not at a level fixed by the costs of high cost plants. In the face of such a proposal the steel trade has modified its first feeling of satisfaction with the recent official action on present prices.

Lake Superior ore producers, who make sales for an entire year, are organizing a protest against a possible revision of their 1918 contracts. Thus far considerable reservations of ore have been made at Cleveland, but actual sales are deferred until prices can be definitely fixed.

Hundreds of thousands of tons of export steel is piled up at Eastern ports awaiting shipment, and large sales for export could be put through if bottoms could be had. In wire a 50,000-ton inquiry has been up, but could not be entertained. The Government is seeking 50,000 tons of open-hearth rerolling billets for shipment abroad.—*Iron Age.*

Men of the Industry

Changes in Personnel and Position

Disbrow Joins Moore Motor Vehicle

MINNEAPOLIS, Jan. 7—Louis Disbrow, famous automobile racer and engine designer, has joined the Moore Motor Vehicle Co. in the capacity of chief engineer. After attending the New York and Chicago shows he will assume full charge of the engineering department of the Danville factory.

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E. B. Foote has resigned from the sales managership of the New England District of the Mitchell Motors Co., Boston.

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Walter Bamford, formerly with the Detroiter Motor Car Co., Detroit, has become production manager of the Fulton Motor Truck Co., Farmingdale, L. I.

—

P. W. Litchfield, vice-president and factory manager of the Goodyear Tire & Rubber Co., Akron, has been appointed a member of the War Service Committee by the Rubber Association of America. He will represent the rubber industry in its co-operative relations with the Government.

—

Thomas Wetzel has been elected vice-president of the Buffalo Pressed Steel Co., Inc., Buffalo, N. Y.

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C. J. Cunningham has been promoted to the position of general service manager of the Detroit Weatherproof Body Co., Pontiac, Mich.

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Arthur H. Wyatt has been elected president of the Pan-American Motors Co., Decatur, Ill. He has been with the company several years.

—

John B. Orman, who has managed several automobile shows in Indianapolis, was chosen by the Indianapolis Automobile Trade Association to conduct the 1918 show, which will be started Feb. 25.

—

J. R. Coleman, who has been chief engineer and assistant general manager of the Atterbury Motor Car Co., Buffalo, is now factory manager in charge of production and purchasing, with the Selden Motor Vehicle Co., Rochester, N. Y.

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John F. Guider, formerly factory superintendent of the Pierce Arrow Motor Car Co., Buffalo, and an executive of that company for more than 12 years, has been elected vice-president of the Cadillac Motor Car Co., Detroit, and will have charge of manufacturing.

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Elbert S. Maloney has been appointed manager of the Richmond branch of the Fisk Rubber Co. He was formerly Arkansas representative of the Diamond Rubber Co. and Washington representative of the Goodyear Co.

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W. E. Palmer has been elected treasurer of the Goodyear Tire & Rubber Co., Akron. He is also secretary of the board of directors.

—

Glenn P. Thayre, manager of the Demountable Wheel Co., Pontiac, has resigned to enter Government service. Walter Brohe is now manager.

—

Benjamin F. Baker has been appointed wholesale representative in New York for the International Harvester Co. He will make his headquarters at the Philadelphia factory branch. Baker was formerly Brooklyn manager and efficiency expert for the Garford Motor Truck Co.

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Earl W. McGookin has been appointed to represent the Tillotson Mfg. Co., Toledo, in Michigan and Cleveland.

—

C. H. Bassett has been made southern zone manager for the Elgin Motor Car Corp., Chicago.

—

S. H. Woods, formerly with the General Vehicle Co., Long Island City, and the International Motor Co., New York, is now a captain in the Quartermaster's Corps, and is connected with the Military Truck Production Section in Washington.

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William Field has been appointed assistant sales manager of the Fisk Rubber Co., Chicopee Falls, Mass.

—

Ford Takes Part of Holley Plant

DETROIT, Jan. 7—The Ford Motor Co. is taking over the part of Holley Brothers Co. plant used in the manufacture of carbureters for the Model T car. At present the carbureter company is reorganizing as the Holley Kerosene Carbureter Co., and will manufacture a new kerosene carbureter together with the regular models.

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Dividends Declared

CLEVELAND, Jan. 4—The Kelly-Springfield Tire Co. has declared the regular quarterly dividend of $1 a share on common stock, payable Feb. 1, to stock of record Jan. 15.

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WEST CHESHIRE, CONN., Jan. 5—The Connecticut Brass & Mfg. Co. has declared an initial quarterly dividend of $2 a share on its second preferred stock, payable Jan. 21 to stock of record Dec. 31.

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NEW BRUNSWICK, N. J., Jan. 5—The United States Rubber Co. has declared a quarterly dividend of 2 per cent on first preferred stock, payable Jan. 31 to stock of record Jan. 15.

New Companies Formed

Latest additions to ranks of Automotive Industries

$1,000,000 Company to Operate Carriers

WILMINGTON, DEL., Jan. 3—The Capp Motor Transfer Co. has been incorporated to operate private carriers by water and air. The incorporators are: Seth Bunker Capp, F. R. Hansell, Philadelphia, and J. Vernon Pimm, Camden, N. J. The capital is $1,000,000.

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To Make Vehicles of All Kinds

DOVER, DEL., Jan. 3—A company to manufacture motor cars and vehicles of all kinds has been organized here under the style United Owners' Supply Co. The incorporators, J. Berliner, P. Zak and B. F. Cowan, Chicago, have listed the capital at $200,000.

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Russel Co. to Make Tires

NEWARK, N. J., Jan. 3—The Russel Tire Co. has been incorporated with a capital of $100,000 by R. T. Blinder, Frank Hahl and Benjamin Singer. The company will manufacture tires.

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BUFFALO, Jan. 7—William H. Race & Sons Motor Co. has been incorporated to manufacture engines. The incorporators are William L. Race, L. W. Race and Wilfred E. Race and the stated capitalization is $25,000.

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Hassler, Ltd., Opens in Canada

HAMILTON, ONT., Jan. 5—Robert H. Hassler, Ltd., has been incorporated and has leased a factory on Sherman Avenue, North. The new company will manufacture shock absorbers for Fords. J. C. Piper has been appointed managing director.

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Airplane Parts Company Formed

MILWAUKEE, Jan. 7—The United States Aero Propeller Co. has been incorporated with a capital stock of $30,000 to manufacture propellers and other parts for airplanes.

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Dealers Discard Night and Sunday Service

GRAND RAPIDS, Jan. 4—Eighteen leading dealers here have done away with night and Sunday service, as a means of reducing overhead expenses. In order that service may still be rendered at night, they have designated Bronson's Garage in the downtown section, as an emergency service station for all dealers, and have notified 5000 car owners here of the new plan. Short-time repair jobs will be done night and Sunday by Bronson's Garage, but work which cannot be finished in a short time is turned over to the proper dealer at the beginning of the next day.

Mercury Cars, Inc., to Start Production

NEW YORK, Jan. 7—Mercury Cars, Inc., which was recently formed in New York, is preparing to place on the market a 4-cylinder car powered with a 3½ by 5½ Weidely engine, to sell for $2,750 to $2,950 in open models and $3,600 to $3,900 in closed models. The company has established a factory of limited size at Hollis, L. I., and plans to enlarge this long before active production of cars is commenced, which probably will be mid-summer of this year. The car, the first of which is on view at the Astor salon, is very simple in construction, and has been designed to require the minimum of care. It will have a wheelbase of 114 in.

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Kelly-Springfield Opens Milwaukee Branch

MILWAUKEE, WIS., Jan. 7—The Kelly-Springfield Tire & Rubber Co., New York, has established a branch house in Milwaukee, at 426 Jefferson Street, in charge of J. A. Glaspy. Another office will be maintained in the Bay Building, Madison, Wis.

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Gillette Tire Co. Enlarges Plant

EAU CLAIRE, WIS., Jan. 7—The Gillette Tire Co. is contemplating the erection of 2 additional stories on its present 1-story main factory. To provide immediate warehousing and shipping facilities, the company has planned a 3-story concrete and brick building, 66 x 100, adjoining the main factory.

—

Reliance Truck to Move to Appleton

APPLETON, WIS., Jan. 7—Contracts will be awarded this week for the erection of the new Appleton plant of the Reliance Motor Truck Co., which is moving from Racine, Wis. The first unit will provide about 22,500 sq. ft. of floorspace and cost $50,000. The building will be ready for occupancy about April 1, at which time the equipment and machinery of the present plant in Racine will be moved. New equipment is being purchased for delivery early in April. The Reliance commercial car will be in regular production in Appleton about May 15.

—

Service Motor Truck Plans Additions

INDIANAPOLIS, Jan. 6—The Service Motor Truck Co., Wabash, Ind., which recently obtained a government contract for the manufacture of trucks, is planning the construction of two large additions to its plant. One of the buildings will be 75 x 200, and the other 50 x 400.

—

Hawke Transferred to Detroit

DETROIT, Jan. 8—Clarence B. Hawke will be associated with the sales division of the motor parts department of the Rich Tool Co., Chicago. His headquarters will be in the Detroit office.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

Damrow Co. to Occupy New Plant

FOND DU LAC, WIS., Jan. 7—The Damrow Bros. Mfg. Co., Fond du Lac, Wis., manufacturer of sheet metal containers and stampings, will move into its new plant at Western Avenue and Brooke Street on Jan. 15. Because of the shortage and difficulty of obtaining supplies of sheet tin, the company has decided to install a complete rolling mill and will manufacture its own supply of sheets from the rough pig.

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Cassidy Branches Out

NEW YORK, Jan. 7—The Edward A. Cassidy Co. has opened a Western branch office at 1716 Michigan Avenue, Chicago, with the idea of bringing its Western trade into close contact with the company officials. R. G. Ames, division manager for Chicago and surrounding territory, will have charge.

—

Changes of Capital

CLEVELAND, Jan. 3—The Ohio Rubber Co. has increased its capitalization from $400,000 to $500,000.

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AKRON, Jan. 7—The Goodyear Tire & Rubber Co. has issued $15,000,000 of 8 per cent cumulative second preferred stock. The company is asking authority to increase its capital stock $50,000,000, half preferred and half common. If this is done, the authorized capital will be $100,000,000.

—

CLEVELAND, OHIO.—The Fred P. Brand Motor Co.. increase of capital from $30,000 to $250,000.

—

COLUMBUS, OHIO—The Independent Tire Co., increase of capital from $10,000 to $50,000.

—

Capital Increases

COLUMBUS, OHIO, Jan. 5—The following are the capitalization increases in the past week: Buckeye Motor & Cycle Co., Akron, $15,000 to $50,000; Dayton Reliance Tool & Mfg. Co., Dayton, $20,000 to $50,000; Fred P. Brand Motor Co., Cleveland, $30,000 to $250,000; Steubing Truck Co., Cincinnati, $5,000 to $80,000.

—

Bigsby to Investigate Factories

WASHINGTON, Jan. 7—G. L. Bigsby, engineer for the Anderson Electric Co., has been loaned by his company to the Automobile Industries Committee, and will serve on the corps of engineers now employed by that committee for investigation of automobile and parts factories.

Haskelite to Build Grand Rapids Factory

GRAND RAPIDS, Jan. 5—The Haskelite Co., capitalized at $1,000,000 for the manufacture of special veneer airplane parts, is preparing to establish a factory near Fuller station. This company already has a factory at Ludington, Mich., but the main factory will be in this city. It is estimated that the industry will bring about 3000 persons into Grand Rapids.

—

Ford Producing 78,258 Cars a Month

DETROIT, Jan. 5—All rumors to the contrary, the production of the Ford Motor Co. still continues above normal. During the months of September, October and November a total of 234,774 cars have been manufactured, or an average monthly production of 78,258 cars. This has been done coincidently with the manufacture of Government material and unless subsequent Government orders materially decrease the production, the company will reach its schedule for the year totalling 900,000 cars.

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Butler-Veith Takes Fageol Output

BERKELEY, CAL., Jan. 4—The Butler-Veith Co. has contracted for the entire truck output for the United States of the Fageol Co. A branch has been opened at 1628 Market Street, San Francisco, with W. A. Knuckey in charge.

—

Flottorp Starts Propeller Production

GRAND RAPIDS, MICH., Jan. 5—The Flottorp Mfg. Co., manufacturing aircraft propellers, expects to make the first shipment this week. At present about 40 employees are working and it is expected that this will be increased to 250 when the full running schedule is reached.

—

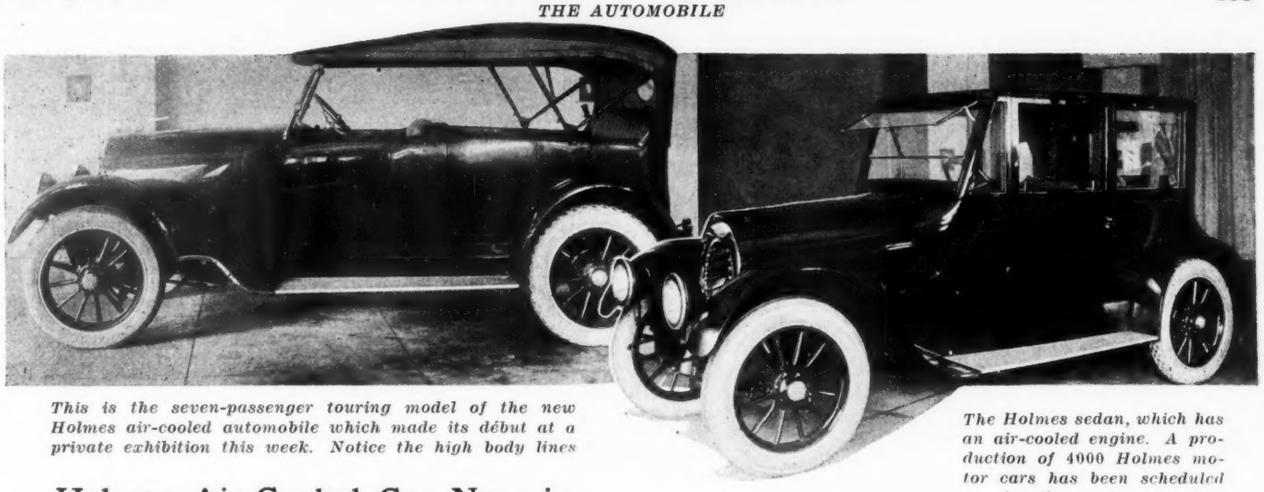
Premier Motor Increases Force

INDIANAPOLIS, Jan. 6—The Premier Motor Corp. is making rapid strides to fill its Government contract for the manufacture of Liberty trucks. The working force is being increased rapidly, and officials of the company announced to-day that it would be necessary to employ at least 300 women to rush work on the contract.

—

Brewer-Mosel to Sell Wisconsin Tractors

SAUK CITY, WIS., Jan. 7—The entire output of the Wisconsin Farm Tractor Co. will be sold by the Brewer-Mosel Automobile Co., Madison, and an active sales campaign has been undertaken already. The Wisconsin company, which was organized in 1915, manufactures a kerosene tractor capable of drawing 4 plows and serving as a power plant for grain separators and other farm machinery.



This is the seven-passenger touring model of the new Holmes air-cooled automobile which made its début at a private exhibition this week. Notice the high body lines

The Holmes sedan, which has an air-cooled engine. A production of 4000 Holmes motor cars has been scheduled for the coming year

Holmes Air-Cooled Car Now in Production

Canton Product Has Overhead Valves and Vertical Fins

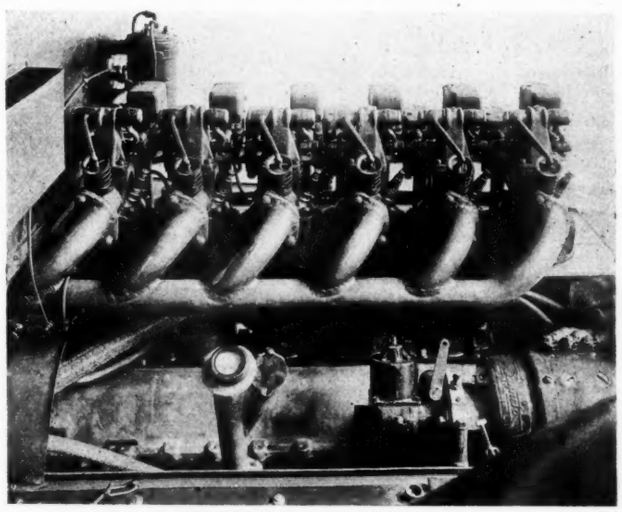
AMERICA'S second air-cooled car, the new Holmes, about which there has been much speculation, quietly made its debut at a private exhibit this week. As was expected the design of Robert Holmes, formerly vice-president of the Franklin company and for seven years its chief engineer, the new car has a number of features which are the same in principle as those of the older ones, but differs considerably in the method of their working out.

This is the product of the Holmes Automobile Co., Canton, Ohio, organized about a year ago. A production of 4,000 has been scheduled for the year, with the first twenty cars coming through this month. The car appeared as a seven-passenger touring and a sedan on the immediate program, with a roadster to come through later. The price has not been fixed definitely, but is between $2,000 and $2,500.

The method of cooling which has characterized Franklin practice, that is by means of a draft of air induced by a suction fan and led around vertically finned and separately cast cylinders is incorporated in the Holmes car, but instead of having the air jacket around individual cylinders the Holmes has its air jackets inter-connected. The construction of the cylinders themselves is similar to the older type, but the Holmes has removable cylinder heads of dome shape carrying inclined valves, which are operated by a patented mechanism designed to compensate more fully for elongation and contraction due to changes in temperatures in the bush rods. The valve mechanism consists of a connection between bush rod and valve stem through two bell cranks and an adjustable linkage so arranged, that even with the maximum elongation of the push rod there is less than .001 in. variation in the distance between tappet and valve stem.

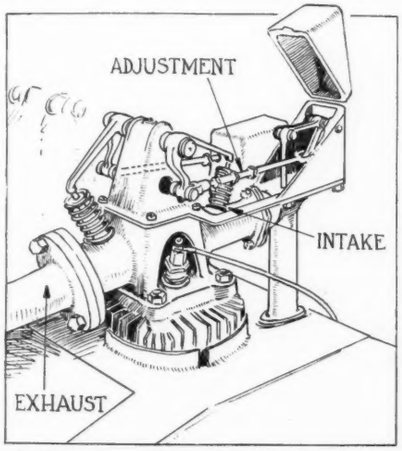
The use of the dome-shaped cylinder head into which the valves are set at an angle permits exceptionally large valves, particularly exhaust valves, and producing in addition to more power the more important factor with an air-cooled car, a cooler cylinder with minimum combustion chamber area. The removable head can be taken off by taking out four machine screws and one nut, which displaces the entire valve mechanism as a unit.

Details of the engine design aside from the valve mechanism and cooling arrangement include a six-cylinder, individually cast engine 3½ by 4½ in. Lubrication is pressure feed throughout by gear pump with oil leads to each main bearing. The crankshaft is drilled, carrying the oil to the connecting-rod bearing and oil is sprayed from these for piston lubrication so that the engine base is dropped.



Exhaust side of the new Holmes engine

The Sirocco type of induction fan, which is incorporated with the flywheel, draws the air through the louvres in the front and thence through an air jacket around all the cylinders instead of through individual jackets. This permits less space between cylinders, making a more compact engine with shorter crankshaft.



Right side of Holmes engine, showing a portion of the valve mechanism

Front view of new Holmes car

Standing Cars Must Be Lighted

BOSTON, Jan. 5—The Massachusetts Supreme Court has decided that motor cars standing by the side of the road at night must have lamps lighted the same as when being operated. James E. Henry left his car standing on the road in Malden at 8.30 p. m. May 3, 1915. He was arrested and found guilty in the lower court. He appealed from one court to another, taking the matter to the Supreme Court as a test case. The higher court now finds that he was guilty of operating his car without lights later than one-half hour after sunset. Judge Crosby, who wrote the decision, said:

"It is obvious that an automobile standing upon a highway under such conditions may be fully as great a menace to the safety of the travelers as if running upon the way, without lights. The word 'operated' is not as the defendant claims, limited to a state of motion produced by the mechanism of the car, but includes at least ordinary stops upon the highway, and such stops are to be regarded as fairly incidental to its operation."

International Harvester to Have New York Distributer

NEW YORK, Jan. 8—The International Harvester Co. hereafter is to be represented in New York. The Whiting Motor Co., which for the past 9 years has handled Mercer passenger cars, has been appointed International distributer for New York and Newark, N. J., territory. There will be a new 2-ton International truck brought out this month. The company will continue to handle the Mercer.

Calendar

ASSOCIATIONS

Feb. 4-7 — St. Louis, American Road Builders' Assn. Convention.

GENERAL

Jan. 11-16—New York, Convention, National Association Automobile Accessory Jobbers, Hotel Astor.

Jan. 16-20—World's Salesmanship Congress, Third Annual.

Jan. 29-31—Chicago, Annual Convention, Garage Owners' Assn. of Ill., Green Room, Congress Hotel.

SHOWS

Jan. 5-12 — New York Show. Grand Central Palace, National Automobile Chamber of Commerce.

Jan. 12-19 — Philadelphia, 17th Annual Show, Philadelphia Auto Trade Assn., Commercial Museum Bldg.

Jan. 11-19—Providence, R. I., R. I. Licensed Auto Dealers' Assn., State Armory, Percival S. Clark, Mgr.

Jan. 14-19 — Rochester, N. Y. Tenth Annual Exposition Park. C. A. Simmons, Mgr.

Jan. 16-25 — Milwaukee, Wis., Milwaukee Automobile Dealers, Inc., Auditorium. (First 7 days, passenger cars; last 3 days, commercial cars.) Bart J. Huddle, Mgr.

Jan. 18-24 — Des Moines, Ia., Ninth Annual Passenger Car and Second Annual Truck, Des Moines Automobile Dealers' Assn., Coliseum. C. G. Van Vliet and Dean Schooler, Mgrs.

Jan. 19-26—Detroit Automobile Dealers' Assn., Overland Bldg. H. H. Shuart, Mgr.

Jan. 19-26 — New York Motor Boat Show, Grand Central Palace, National Assn. of Engine and Boat Manufacturers.

Jan. 19-26—Detroit, Willis Avenue Overland Service Station.

Jan. 19-27 — Cleveland, Seventeenth Annual. Cleveland Automobile Show Co., Wigmore Coliseum. Fred H. Caley, Mgr.

Jan. 19-26 — Montreal, Can., Montreal Automobile Trade Assn., Ltd., Almy Bldg. T. C. Kirby, Mgr.

Jan. 21-26—Manchester, N. H., Academy. Couture Bros.

Jan. 21-26—Scranton, Pa., Scranton Motor Trades Assn., Armory. Hugh B. Andrews, Mgr.

Jan. 21-26 — York, Pa., Queen Street. Tabernacle, York Automobile Dealers' Assn

Jan. 21-26 — Wilmington, Del., Hotel Du Pont.

Jan. 21-26—Buffalo, N. Y., Buffalo Automobile Dealers' Assn., Broadway Auditorium.

Jan. 21-26—Richmond, Va., Richmond Automobile Dealers' Association, First Regimental Armory. Henry B. Marks, Mgr.

Jan. 22-24—Montreal, Can., Convention of All Men Interested in the Automobile Industry in Eastern Canada.

Jan. 22-25—Oklahoma City, Oklahoma City Motor Car Dealers' Assn. Carhart Building.

Jan. 22-26—Baltimore, Md., Baltimore Automobile Dealers' Assn. and Automobile Club of Maryland, 5th Regiment Armory.

Jan. 22-26 — Oklahoma City, Okla., Oklahoma City Automobile Dealers' Assn., 701 No. Broadway. Roy H. Haun, Mgr.

Jan. 23-28—Allentown, Pa., Lehigh Auto Trade Assn., Traylor Motor Co.'s Garage. P. W. Leisering, Publicity Mgr.

Jan. 26-Feb. 2 — Chicago National Show, Coliseum and Armory, National Automobile Chamber of Commerce.

Jan. 26-Feb. 2—Chicago, Salon, Elizabeth Room of Congress Hotel.

Jan. 26-Feb. 2—Bridgeton, N. J., Bridgeton Auto Dealers' Assn. O. P. Riley, Sec.

Jan. 26-Feb. 2—Harrisburg, Pa., Capital City Motor Dealers' Assn. J. Clyde Myton, Mgr.

Jan. 26-Feb. 3—York, Pa., York County Auto. Dealers' Assn., Tabernacle, T. F. Pfeiffer, Sec.

Jan. 28-Feb. 2—Buffalo, N. Y. Buffalo Automobile Dealers' Assn., Broadway Auditorium.

Jan. 28-Feb. 2—Manchester, N. H., Academy. Couture Bros.

February — Greensburg Pa., Westmoreland Automobile Dealers' Association.

Feb. 2-9 — Minneapolis, Minn., Twin City Automobile Truck Tractor and Industrial Exposition, Minneapolis Auto Trade Assn.

Feb. 5-9 — Kalamazoo, Mich., Kalamazoo Automobile Dealers' Assn., Armory.

Feb. 5-9—Binghamton, N. Y., Binghamton Automobile Dealers' Assn., Kalurah Temple. William M. McNulty, Mgr.

February — Peoria, Ill., Peoria Auto and Accessories Dealers' Assn. W. O. Ireland, Mgr.

Feb. 6-9—Lancaster, Pa., Automobile Track Assn., Fidelity Bldg. R. W. Shreiner, Mgr.

Feb. 7-13—Portland, Ore., Ninth Annual Dealers' Motor Car Assn., Auditorium. M. O. Wilhin, Mgr.

Feb. 9-16 — Bronx, N. Y., 2d Battery Armory, Bronx Automobile Dealers' Assn. D. J. Barrett, Mgr.

Feb. 11—Toledo, Terminal Auditorium, Toledo Auto Show Co.

Feb. 11-14—St. Louis, Mo., St. Louis Auto Mfrs. & Dealers' Assn. Robert E. Lee, Mgr.

Feb. 11-16 — Kansas City, Mo., Kansas City Motor Car Dealers' Assn., Convention Hall. E. E. Peake, Mgr.

Feb. 11-16—Kansas City, Mo., Third Annual National Tractor Show.

Feb. 11-16 — Toledo, O., Toledo Auto Shows Co.

Feb. 16-23 — Hartford, Conn., Hartford Auto Dealers' Assn. State Armory. B. F. Smith, Mgr.

Feb. 16-23—Albany, N. Y., Albany Auto Dealers' Assn. State Armory.

Feb. 16-24—San Francisco, Cal., San Francisco Dealers' Assn., Exposition Auditorium. G. A. Wahlgreen, Mgr.

Feb. 18-23—Syracuse, N. Y., Syracuse Automobile Dealers' Assn., State Armory. Harry T. Gardner, Mgr.

Feb. 18-23 — Nashville, Tenn., Nashville Auto Trade Assn., Hippodrome.

Feb. 18-23—Grand Rapids, Mich., Automobile Business Assn., Klingman Building. Ernest T. Conlon, Mgr.

Feb. 18-23—Newark, N. J., N. J. Auto Exhibition, Co. G, First Regiment Armory. Claude E. Holgate, Mgr.

Feb. 18-23—Des Moines, Ia., Des Moines Automobile Dealers' Assn., Coliseum. C. G. Van Vliet and Dean Schooler, Mgrs.

Feb. 18-23 — Springfield, Ohio. Springfield Auto Trades Assn., Memorial Hall. C. S. Burke, Mgr.

Feb. 18-23 — Waterbury, Conn., United Shows Co.

Feb. 18-23—Duluth, Minn., Duluth Automobile Trade Association. John J. Lane, Mgr.

Feb. 18-24 — Des Moines, Ia., Ninth Annual Passenger and Second Annual Truck, Des Moines Automobile Dealers' Assn., Coliseum. C. G. Van Vliet and Dean Schooler, Mgrs.

Feb. 18-25 — Pittsfield, Mass., State Guard, State Armory. James J. Callaghan, Mgr.

Feb. 18-27—So. Bethlehem, Pa., Fourth Annual (cars 18-23; trucks 25-27), Coliseum. J. L. Elliott, Mgr.

Feb. 20-23—Quincy, Ill., First Annual, Armory. L. B. Bartlett, Mgr.

Feb. 23-Mar. 2—Brooklyn, N. Y., Brooklyn Motor Vehicle Dealers' Assn., 23d Regiment Armory. I. C. Kirkham, Mgr. Passenger cars Feb. 23-Mar. 2; Trucks Mar. 5-9.

Feb. 25-Mar. 2—Muskegon, Mich. Second Annual, Merrill Auditorium. John C. Fowler, Mgr.

Feb. 25 - Mar. 2 — Bridgeport, Conn., Fourth Regiment Conn. Home Guard, State Armory and Casino. B. B. Steiber, Mgr.

Feb. 27-Mar. 2 — Columbus, O., Auto Exhibitors Co. W. L. Carney, Mgr.

Feb. 27-Mar. 6 — Boston, Mass., Salon, Boston Automobile Dealers' Assn., Copley Plaza Hotel. Chester I. Campbell, Mgr.

Mar. 1 — Lyons, France, Third Sample Fair.

Mar. 2-9—Boston, Mass., Boston Auto. Dealers' Assn., Mechanics' Bldg. Chester I. Campbell, Mgr.

Mar. 2-9—Pittsburgh, Pa., Automobile Dealers' Assn. of Pittsburgh, Motor Square Garden. John J. Bell, Mgr.

Mar. 4-9—Utica, N. Y., Utica Motor Dealers' Association, Inc., State Armory.

Mar. 6-9—Clinton, Ia., Clinton Automobile Dealers' Assn., Coliseum.

Mar. 6-9—St. Joseph, Mo., St. Joseph Automobile Dealers' Assn., Auditorium. John Albus, Mgr.

Mar. 8-11 — Green Bay, Wis., Brown County Automobile Trade Assn.

Mar. 15-20—Great Falls, Mont., Montana Automobile Distributors' Association. Lexington Garage. A. J. Breitenstein, Mgr.

Mar. 16-20—Great Falls, Mont., Montana Automobile Distributers' Assn.

Mar. 19-24—San Francisco, Cal., Motor Truck Dealers of San Francisco, Auditorium. Ivan R. Gates, Mgr.

Mar. 19-24—Cedar Rapids, Ia., Cedar Rapids Auto Trade Assn., Auditorium.

Mar. 20-22—Houlton, Me., Second Annual, Houlton, Motor Car Dealers' Assn., Bangor St. Exhibition Hall. J. D. Luth, Mgr.

Mar. 20-23 — Trenton, N. J., Trenton Auto Trade Assn. Second Regiment Armory. John L. Brock.

Apr. 9-13—Stockton, Cal., San Joaquin Auto Trade Assn. Samuel S. Cohn, Mgr.

Sept. 23-28 — Chicago, National Accessory Show for Fords. Coliseum.

S. A. E.

Jan. 10—New York Automotive Dinner at Hotel Biltmore.

Feb. 1 — Chicago, War Dinner during Winter Meeting.

ENGINEERING

American Society of Heating and Ventilating Engineers.

Mining and Metallurgical Society of America.